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# This Week in The IRON AGE

Vol. 156, No. 24 December 13, 1945

## Editorial



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## Technical Articles



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## Features



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## News and Markets



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# No Mistaking Ryerson Alloys

## *Certified Quality Demands Positive Identification*

All Ryerson alloy steels are doubly identified. Each bar is painted with colors which indicate the AISI analysis type and the condition of the steel. Larger bars are individually stamped, and smaller bars are bundled and tagged with a heat symbol assigned to the specific heat from which the bars are rolled. This double identification is as unmistakable as finger printing.

All this is important to you because: Each heat of alloy steel in Ryerson stocks has been carefully selected, and thoroughly tested. The exact chemical analysis, as well as the hardenability response for that steel are known. This information, together with an interpretation of obtainable physical properties after quenching and drawing, is assembled in the form of an Alloy Steel Report that is cross referenced with Heat identification. A copy of the Report is sent with each shipment of that particular steel. Thus, you receive steel that is Certified as to quality and performance . . . plus a Report that serves as an accurate guide to best heat treatment.

Take advantage of this identified quality and receive prompt, personal service.

**Joseph T. Ryerson & Son, Inc., Steel-Service Plants: Chicago, Milwaukee, Detroit, St. Louis, Cincinnati, Cleveland, Pittsburgh, Philadelphia, Buffalo, New York, Boston.**

The
IRON AGE

ESTABLISHED 1855

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December 13, 1945

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# *Let's Utilize Productivity*

COLLECTIVE bargaining is here to stay, but it must be real bargaining. In the old days the employer, particularly the absentee owner employer used his power to keep labor down. Today the pendulum has swung, as pendulums do, to the other extreme and labor, with a similar club uses its power to keep the upper hand and the employer down. Instead of trying to keep each other down, which is a futile and non-constructive endeavor, they should try to raise each other up.

In earlier times, before the concentration of productive capacity and of labor power had developed, a strike or lockout confined its effects to the comparatively small groups involved and that minor portion of the public in the immediate locality which might suffer from loss of trade or service. But when the scale of operations increases to that of today and threatens to paralyze activity broadly throughout the country, the situation emerges from that of a private controversy and becomes a public problem.

If collective bargaining is to endure, it must be between equally responsible parties. Labor contracts, like all others, should be enforceable by law.

If management were to be assured that organized labor was amenable to law, like the rest of us and could not throw over a contract as nonchalantly as you can toss a cigar butt from a ferry-boat, it would sit down at the conference table with the assurance that there would not be a thumb tack, sharp end up, on its seat.

So point number one, as I see it is to remove the slant from the collective bargaining table and level its legs. That's a job for Congress.

Perhaps the greatest brake of all on our economic progress is public indifference to productivity because by and large it does not know what it really is and does.

Maximum productivity should and can mean maximum wages. It should and can mean maximum return on investment. It should and can mean more for the consumer's dollar of income in every walk of life. It seems to me that enlightened labor leadership, together with enlightened management, could do a great deal to enlighten the public on this vital truth.

But simple enlightenment is not enough. I think we should do something to make increased productivity worth-while. That means the sharing of its fruits on an equitable basis. What we need more generally in this country are stronger incentives to produce. Progressive management must see to it that an equitable share of productivity gains are passed on to labor in the form of higher wages or preferably some method of profit sharing, and to the consumer in the form of lower prices. These things are fundamental to prosperity and sound management-labor relations.

With our resources in materials and engineering knowledge and labor skill, there is virtually no limit to what we can do, providing we acknowledge the power of productivity and get together to make it work for us.

# *Etching...*

## Another Step in Inland Quality Control

● Among the many product control methods used by Inland are hydrochloric acid etch tests. Through deep etching the character of the internal structure is clearly revealed for visual examination. Samples for these tests are taken from billets, slabs and blooms, rushed to the laboratory and sawed apart to expose a cross section. Each sample is then etched 30 minutes in a 50% hydrochloric acid in water bath heated to 160°F. Then the etched surface is washed, scrubbed and dried. Following this the samples are laid out on inspection benches where Inland metallurgists critically examine each piece.

The etch test and all other product controls are completed and reported before steel is shipped by Inland.

Inland Steel Co., 38 S. Dearborn Street, Chicago 3, Illinois. Sales Offices: Cincinnati, Detroit, Indianapolis, Kansas City, Milwaukee, New York, St. Louis, St. Paul. Principal Products: Bars, Structurals, Plates, Sheets, Strip, Tin Plate, Floor Plate, Piling, Reinforcing Bars, Rails, Track Accessories.

# INLAND STEEL

# NEWSFRONT

► Predicated on the assumption that steel producers here have not been exporting steel in appropriate quantities since the end of the war, CPA is reported to be studying plans for the enforced allocation of 4 to 5 million tons of steel abroad.

► High speed long distance telephone connections are contemplated by the Bell System about 1955 to 1960 when the current development program for dialing by subscribers to any telephone in the country is expected to be completed. Meanwhile, the first stage of the Inter-toll Dialing program in which a subscriber's long distance operator can dial direct to a distant toll area, has gone into operation between New York and Philadelphia.

► Westinghouse has been shopping around for a plant site for its motor production in order to make room at Pittsburgh for switchgear and other facilities. After examining some 15 plants, it appears that the Curtiss-Wright plant at Buffalo may be selected, depending on price negotiations with the government.

► The recently announced program for Bethlehem Steel expansion at Los Angeles has grown to a prospective 100 pct expansion of facilities and contemplates four more openhearths in addition to the new one.

► Outstanding advantage of the plating of metals on plastics is its increased corrosion resistance. Resistance to salt water and industrial atmospheres is excellent since there is no electrolytic action as when a metal is plated on the usual metallic base.

And the plastic itself experiences improved properties. Absorption of oils, solvents and moisture is eliminated. Tensile, impact and flexural strength is increased, and resistance to abrasion and distortion under heat.

► Excellent machining properties of aluminum alloy 75S are believed due to the zinc intermetallic compound which gives the metal free machining properties. With the use of tungsten carbide tools, properly ground, a better finish may be obtained than on any other high strength wrought aluminum alloy. Less warpage is encountered than in 24ST or 14ST and tool life is appreciably greater.

► To obtain a minimum grain size and structural homogeneity, hypo-eutectoid alloy steels when being conditioned for machining and cold working should be pre-normalized from a temperature just above their respective Ac3 temperatures.

Small grain size thus achieved persists through the subsequent austenizing and softening treatments and accelerates final spheroidization.

► RCF is reported to be preparing to ask for competitive bids with a floor for the Geneva Steel plant. Steel interests think the floor will be too high.

► Unless proposed stockpiling legislation is enacted before Jan. 3, SPA may proceed to recommend disposal of surplus strategic metals and minerals now held by RFC, Treasury and the armed services.

► The House version of the Full Employment Bill now designated as the "Employment Production Act" eliminates all reference to a "right" to a job contained in the original bill and aims at "high levels" of employment, production and purchasing power.

► OWMR deputy director Hans A. Klagsbrunn is the authority for the statement that military purchases have been cut from about $40 billion in early August to around $13 billion. Some 40,000 contracts out of more than 120,000 that were on the books have been settled.

► Pointing out that the physical first steps toward reconversion have gone well, the same authority said that the government had nearly 56,000 requests between V-J Day and Nov. 1 for clearances of government-owned machinery out of plants. That's an average of better than 700 a day. Thirty-five thousand clearances have been completed, two-thirds of them in 40 days or less after the request.

► While immediate British auto production is in models identical to prewar cars, some small firms are redesigning their products completely. A typical example, the Jowett Javelin breaks away from conventional body design for airplane styling, and features a horizontally opposed four cylinder engine.

# . . . Setup Charts for Bullard

SIMILAR in its operation to a six or eight-station automatic screw machine the Type D Bullard Mult-au-matic is basically designed to machine castings or forgings instead of bar stock, and therefore each spindle must be in the form of a chuck instead of a collet, and each piece must be inserted and removed by hand at the completion of each sequence of operations. Since these machines are designed for the turning of castings or forgings it is quite reasonable to assume that the simplest design would be to erect the machine on a vertical axis. This provides easier accessibility and facilitates handling of the castings in the chucks. It also permits more compactness in design with resultant economy in floor space. The base section of the Bullard is round in form with a turntable ring surrounding the central column. The turntable supports the chucks which are free to rotate thereon. The lubricant and coolant reservoirs are beneath the turntable, inside the base.

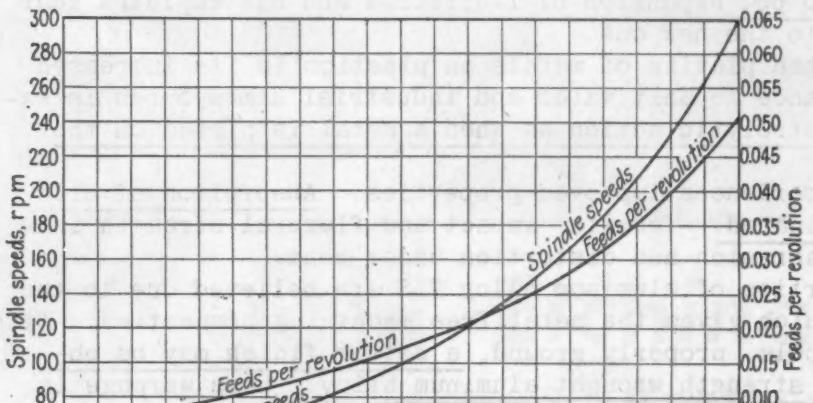



FIG. 1—Chart of feeds and speeds for six and eight-spindle, Type D, 8-in. Bullard Mult-Au-Matics with back gears normal.

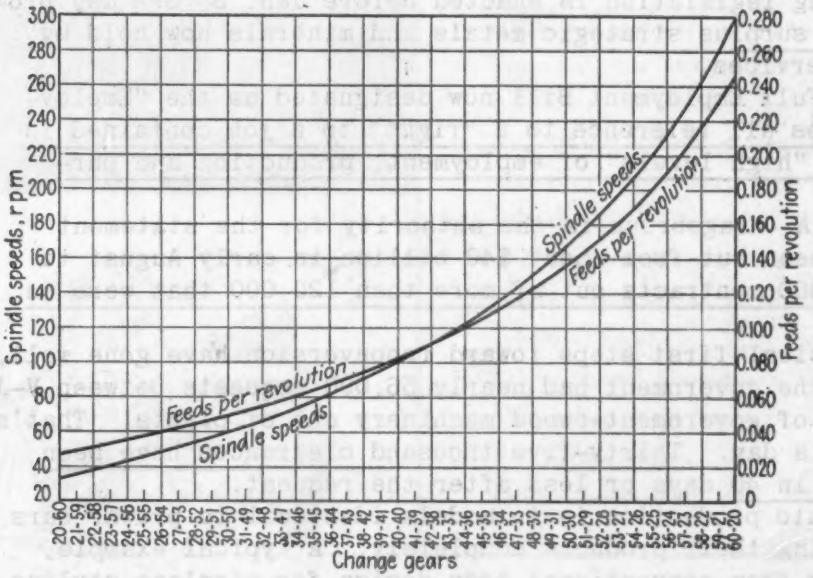



FIG. 2—Chart of feeds and speeds for six and eight-spindle, Type D, 8-in. Bullard Mult-Au-Matics with back gears reversed.

On each machine there is a loading station where the castings or forgings are chucked or removed, while the remaining stations are evenly distributed around the machine for the cutting operations. There may be either five or seven operating stations depending upon whether it is a six or an eight-station machine. At each station the cutting tools are mounted upon slides which are arranged to move in vertical ways. These are supported on the central column which encloses the drive and indexing mechanisms.

The control mechanisms are located within the overhead enclosure which is known as the feed works area. The main drive motor is located on top of the machine, and transmits its energy through bevel gears in the main drive bracket. This energy is applied through a main clutch located just below the main drive bracket, with a bypass drive through the clutch to the indexing units. The timing of the machine is entirely dependent upon this indexing drive which controls the mechanism by which the cutting cycle is initiated.

While the index lock lever is "in" the indexing drum is held in such a way as to disengage the indexing clutch so that nothing happens. Normally the cutting cycle is initiated by the functioning of the indexing trips which are located at each station. The last of these to operate is the one that initiates the cycle. If the indexing trip at each station is engaged and the index lock lever is released, the indexing drum is partially rotated by a spring. This motion actuates the indexing clutch so as to engage the indexing mechanism with the indexing drive shaft, causing the machine to index.

This motion is accomplished by one revolution of the center shaft which thereby actuates the geneva movement and at the same time rotates the control and indexing drums through one revolution. This motion of the control drum engages the control

# Mult-Au-Matics

By JOHN J. MEADOWS
*Consulting Engineer, New York*

**. . . When setting up a Bullard Mult-Au-Matic it is no longer necessary for the setup man to spend valuable time and run the risk of error in making his own calculations. Charts are presented herewith to enable him to see at a glance the correct pair of change gears for each spindle speed and rate of feed. These charts are similar to the ones presented in THE IRON AGE, July and August, 1945, for use with automatic screw machines.**

levers at each station with the corresponding control stops on the drum, and compresses the actuating spring, thereby cocking it for the next indexing cycle. The corresponding rotation of the control drum causes the actuation of the traverse engaging levers which cause the traversing clutches to tend to close on the feed mechanisms. Under normal circumstances the index lock lever would not be "in" and the indexing mechanism would be controlled by the index control levers at each station. The last of these to lift would initiate the cycle under automatic operation.

## Spindle and Feed Mechanism

The main clutch controls the spindle and feed mechanisms. It is controlled by a main clutch operating ring that can be actuated by hand at any station on the machine. Normally the main clutch is engaged. The gear on the main clutch, referred to as the main clutch gear, drives a main ring gear which surrounds the central shaft. This in turn drives the various spindle drive shafts through change gears which are located in the upper works on top of the feed mechanisms at each station. The feed drives are driven by the spindle drive shafts in a manner similar to the Gridley type automatic screw machines, wherein a direct relationship of feed per revolution is established by the feed change gears and is unaffected by the spindle change gears.

However, there are two differences that must be considered in comparing this feed with the Gridley automatics. The first is that each station has its own individual drive which can be different in both feed and speed from any other station. And, second, the high speed or traverse operation is obtained by means of a high-low speed transfer clutch, as against the overrunning clutch that is customarily used in Gridley automatics. The traverse side of this clutch is driven from the shaft head of the spindle change gears so as to give a constant traversing speed under all conditions. The feed side is driven through compound feed change gears which are driven by the spindle drive shaft. Actuating the clutch causes the feed worm to be rotated in either high or

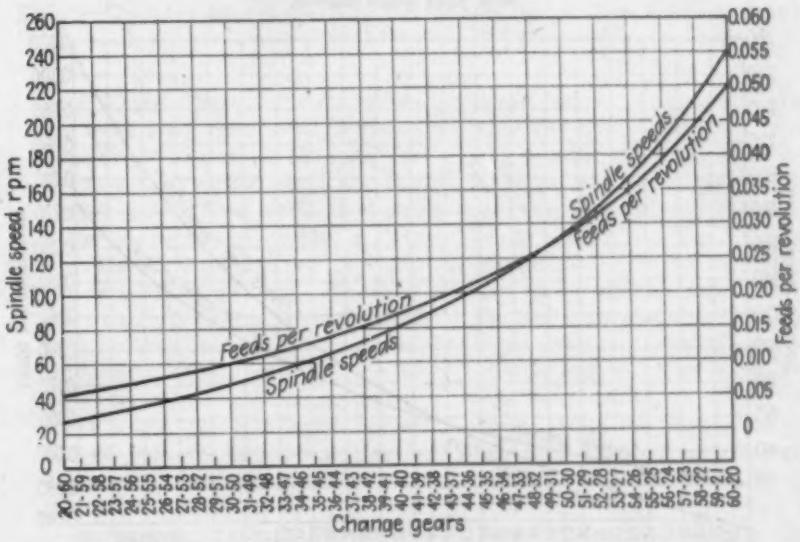



FIG. 3—Chart of feeds and speeds for six and eight-spindle, Type D, 12-in. Bullard Mult-Au-Matics with back gears normal.

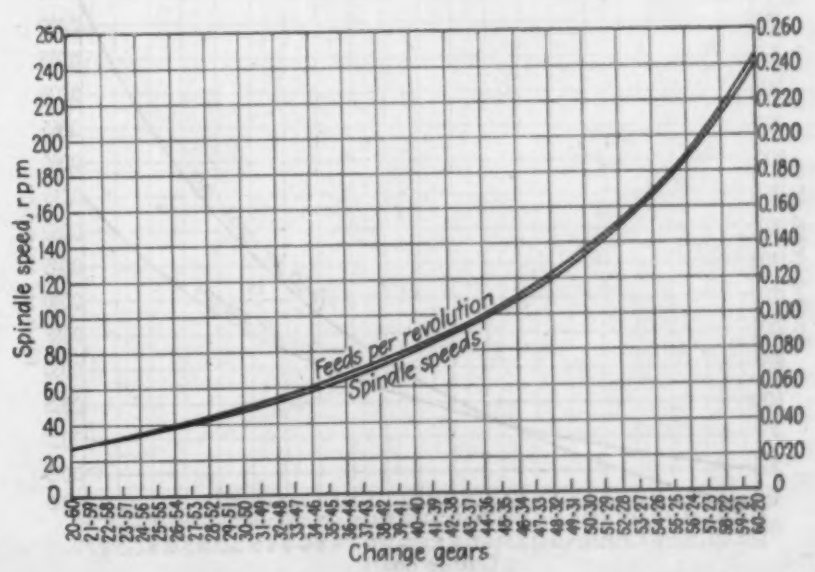



FIG. 4—Chart of feeds and speeds for six and eight-spindle, Type D, 12-in. Bullard Mult-Au-Matics with back gears reversed.

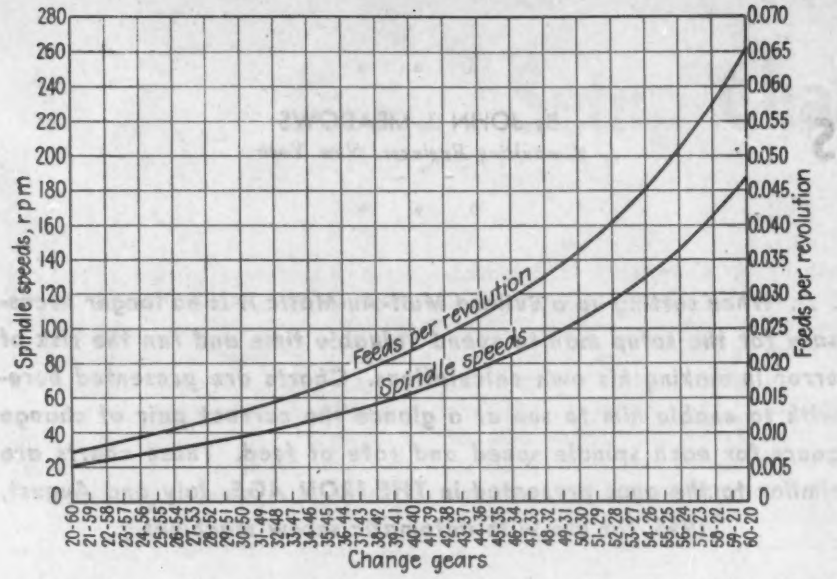



FIG. 5—Chart of feeds and speeds for six-spindle, Type D, 16-in. Bullard Mult-Au-Matics with back gears normal.

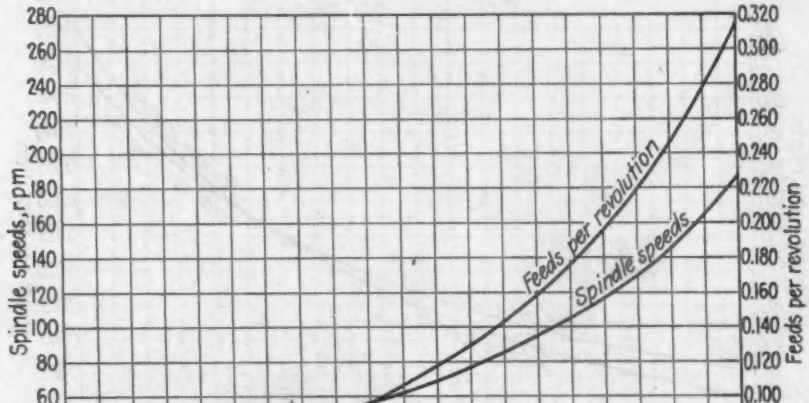



FIG. 6—Chart of feeds and speeds for six-spindle, Type D, 16-in. Bullard Mult-Au-Matics with back gears reversed.

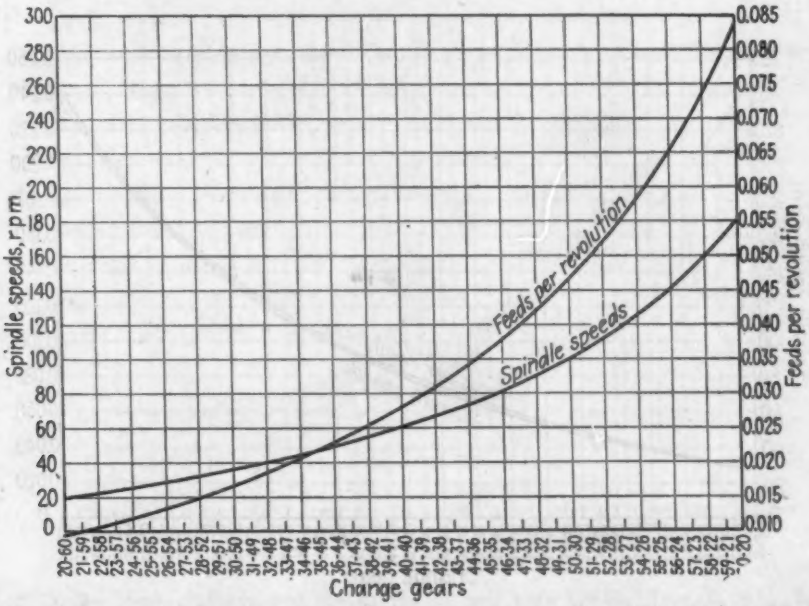



FIG. 7—Chart of feeds and speeds for eight-spindle, Type D, 16-in. Bullard Mult-Au-Matics with back gears normal.

low speed. The feed worm drives the feed drum gear which rotates the feed drum on which is mounted the feed cam.

On the same shaft as the feed drum are mounted the timing disk and the brake lever plunger and traverse auxiliary cam. The function of the brake lever plunger is to actuate the brake momentarily in order to stop the feed at the high point of the withdrawal stroke where indexing takes place. The timing disk is the mechanism where adjustments are made in order to regulate the length of each part of the cycle. On the timing disk are located the feed engaging and return dogs, the stop dog, and the indexing trip dog. The first two are adjustable, and the latter two fixed as they bear definite relationships to the machining cycle. The feed dog actuates the feed clutch to throw the feed drum from traversing speed to cutting speed, and the return dog to return the drum to traversing speed after the cutting cycle has been completed, at the end of the dwell.

The stop dog is for the purpose of returning the clutch to neutral when the slide follower reaches the top of the feed cam preparatoy to indexing. This motion is anticipatory in character and serves to place the clutch lever spring in compressing through the transfer of the shift cam rod into the neutral position while the feed clutch lever is still deflected by the neutralizing cam. It is this spring compression that causes the clutch lever to deflect into the neutral position as soon as the follower leaves the traverse lobe of the neutralizing cam. This accomplishes the exact timing of the clutch neutralization at the top of the slide motion when the feed drum following is at the topmost position preparatory to indexing. Timed with this motion is the index trip cam which deflects the corresponding index control lever. The simultaneous lifting of all of these levers results in the release of the index control drum which in turn initiates the indexing of the machine.

The rotation of the indexing or central shaft causes the simultaneous rotation of the upper control drum upon which is mounted the main clutch operating cam. This cam disengages the main clutch and thereby stops the feed works during the indexing operation. This function occurs right after neutralization of the feed cam layer by the timing of the neutralizing cam. The feed works are again set in motion, at the completion of the indexing operation, by the traverse engaging arm which is

actuated by the corresponding traverse trip dog on the upper control drum at the completion of its indexing rotation. At the same moment the main drive clutch is re-engaged. In automatic operation this cycle is repetitive.

During the indexing operation a modified geneva movement pumps the carrier from one position to the next, while the motion of the carrier is utilized to cam each sliding pinion on the spindle shafts longitudinally out of engagement with the spindle gears. This permits the movement of the spindles from one position to the next in spite of the stationary character of the spindle drive shafts. As the carrier is indexed into position for the next operation it is locked into position by means of a locking pin and a carrier binder pin, both of which are cammed into position by a locking pin cam which is secured to the central or indexing shaft. As the indexing operation is initiated these pins are withdrawn by means of their levers, the withdrawing of which is initiated by the compression of a spring followed by its sudden release. This tends to catapult the pin out of the hole, an operation made necessary because of the wedge action used in securing the pin in the hole so as to prevent play or backlash.

These machines are sometimes equipped for double indexing, in which case the carriage or carrier moves two stations instead of one, and duplicate tools are required for every two stations. In such cases the machines must be modified so as to provide two loading stations leaving only four or six operating positions available, depending upon the total number of stations on the machine. Of these only half that number of operations can be performed because of the duplication of operations.

## Use of Set-Up Charts

The setting-up of these machines is not too complicated if the functional operations as described above are properly understood. In order to assist the set-up man in his function, set-up charts have been devised. From inspection it can readily be seen that the fundamentals of setting-up are quite simple. For each size two charts are provided, one with back gears normal and the other with back gears reversed. Reversing the back gears serves to increase the range of feeds for heavier cuts. The charts are used as follows:

Let it be assumed that an 8-in. six-spindle Type D Bullard is to be used. Three different spindle speeds are to be used, three cutting operations are to be done at 180 rpm, one is to be done at 240 rpm, and one at 300 rpm. Two operations are to be performed at 0.040 in. per rev, one at 0.100 in. per rev, and two at 0.006 in. per rev. Either of the 8-in. Bullard charts can be used to determine spindle change gears, while both charts will have to be used for feeds. Entering either chart along the left hand border at 180 rpm the horizontal line is followed to its intersection with the spindle speed curve. This will occur between two sets of change gears 51/29 and 52/28, either of which will give approximately the speed desired, the first will give 176 rpm and the other 185.5 rpm. In like manner the chart is entered at 240 rpm and the curve will be intersected between the change gears 56/24 and 57/23. The 300 rpm line intersects the curve directly upon the 60/20 change gear line. The feed change gears are determined by analysis from the right hand side of the charts. The 0.040-in. feed can be obtained in either of two ways. With the back gears normal the feed gear curve is intersected approximately on the 56/24 change gear line, while with back gears reversed the intersection is approximately on the 26/54 change gear line. One is actually above the de-

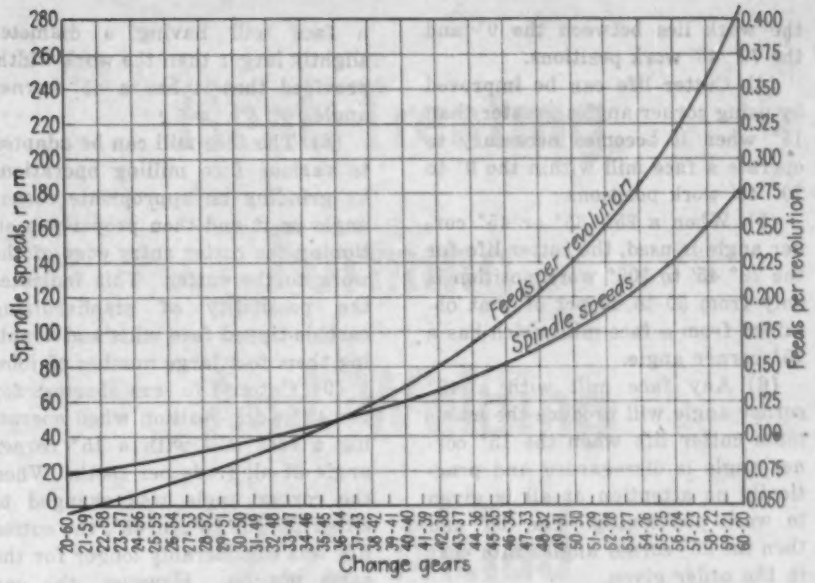



FIG. 8—Chart of feeds and speeds for eight-spindle, Type D, 16-in. Bullard Mult-Au-Matics with back gears reversed.

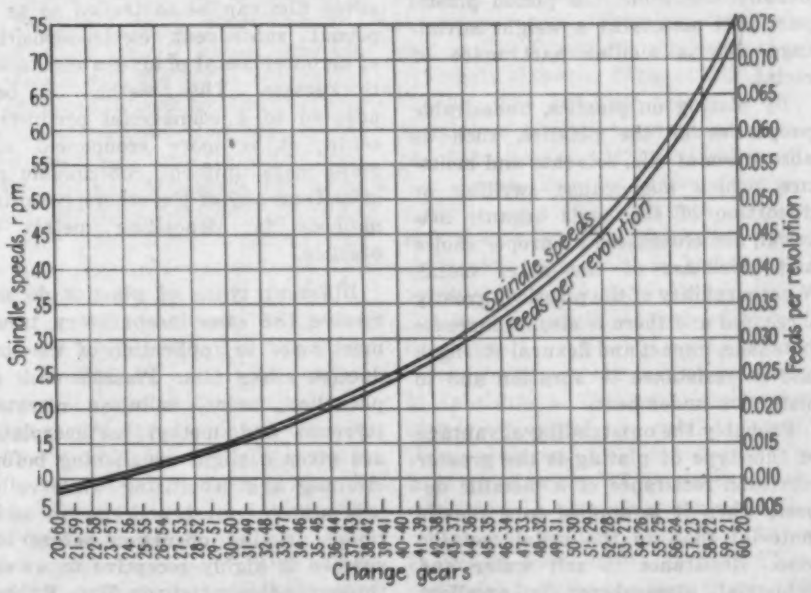



FIG. 9—Chart of feeds and speeds for eight-spindle, Type D, 16-in. to 23-in. Bullard Mult-Au-Matics with back gears normal.

the work lies between the 0° and the 70° 45′ work positions.

(4) Cutter life can be improved by using corner angles greater than 15° when it becomes necessary to operate a face mill within the 0° to 70° 45′ work positions.

(5) When a 25°, 35° or 45° corner angle is used, the cutter life for the 70° 45′ to 100° work position is only from 50 to 60 pct of that obtained from a face mill which has a 15° corner angle.

(6) Any face mill with a 45° corner angle will produce the maximum cutter life when the 15° corner angle is disregarded and practically no attention at all is given to work positioning. The 35° and then the 25° corner angles rate next in the order given.

(7) Mediocre but somewhat consistent results can be obtained with a face mill having a diameter slightly larger than the work width, provided that it has a 45° corner angle.

(8) The face mill can be adapted to various face milling operations by grinding an appropriate corner angle on it and then properly positioning the cutter entry edge of the work to the cutter. This indicates the possibility of standardizing carbide-tipped face mills and adapting them to a large number of jobs.

(9) Cutter life was shortest for the 45° work position when operating a face mill with a 15° corner angle at all feeds per tooth. When the corner angle was changed to either 25°, or 35°, or 45°, the cutter life was considerably longer for the same position. However, the one work position which gave the reduced cutter life was transferred to two positions, one at 40° and the other at 50°, either side of the 45° position. This set of conditions is worth further analysis. It must be kept in mind that all conclusions were reached as a result of using a face mill on work having a 1½-in. wide cut.

While these tests were being run, it was observed that when runs were made at the critical 45° work entry position, the cutter life could be increased many times for some cuts wider than 1½ in., even though the stock removal was much greater. This seems to indicate that the position where a cutter tooth leaves the work or a possible variation in cutter-flywheel-spindle momentum may affect cutter life. This is another phase of work positioning which will be given extensive study in the future.

# Electrodeposition of Metals on Plastics

THE process of plating on plastics is not intended to imitate metal but rather to yield a product that cannot be economically made of metal, Harold Narcus, chief chemist of the Plating Processes Corp., Holyoke, Mass., writes in a paper contributed to the Electrochemical Society symposium on "Before and After Plating." More intricate shapes can be readily molded and electroplated than can be fabricated in metal and electroplated. As the weight added by the application of metal to the plastic is usually negligible, the plated plastic part still maintains a weight advantage over a similar part made of metal.

By plating on plastics, undesirable properties of the plastics, such as absorption of oils, solvents and moisture, which may cause swelling or distortion of the basis organic material, are eliminated by proper choice and thickness of the outer metal. Weatherability of the plastic is greatly increased and there is also an increase in tensile, impact and flexural strength and in resistance to abrasion and to distortion under heat.

Probably the outstanding advantage of this type of plating is the greater corrosion resistance of a metallic deposit when it is applied to a plastic material than to the usual metallic base. Resistance to salt water and industrial atmospheres is excellent since there is no electrolytic action. The inert, nonmetallic plastic coating and hence of the entire plated part.

Chemical reduction to form a conductive metal film on nonconducting surfaces such as plastics has many advantages over other available methods. The two main advantages of the chemical reduction method, especially the process utilizing silver films, are (1) the silver film covers the entire surface of the plastic regardless of its shape so that proper electric contact is established over the entire surface to be electroplated and (2) the thickness of the very thin silver film can be controlled so as to permit subsequent electrodeposition of an outer metal in accurately known thicknesses. This method is best adapted to a commercial production setup; it is more economical and gives more uniform, controllable results than any of the other prevailing methods for depositing metals on plastics.

Different types of plastics do not receive the same preparatory treatment prior to application of the conductive silver film. Plastics such as phenolics, ureas, cellulose nitrates, styrenes and methyl methacrylates are given a slight roughening before cleaning and sensitizing while cellulose acetates must undergo an additional priming operation before the surface is highly receptive to a continuous, adherent silver film. Rubber compounds are prepared for electrodeposition by immersion in benzol or acetone for roughening after which they are cleaned and sensitized. Casein plastics use water as the swelling agent or roughener. Urea-formaldehyde resins are roughened in a 10 pct hydrochloric acid solution and treated in a 1 pct ammoniacal ferrous sulfate solution for 15 min at 59° F. They are then placed in a 2 pct copper sulfate solution for 3 min at 86° F.

The preparation of the nonmetallic surface prior to the deposition of the silver film involves the following steps: (1) Slight roughening or deglazing of the plastic surface; (2) cleaning the surfaces; (3) sensitizing the surface; (4) formation of the silver film by chemical reduction; (5) electrodeposition of an intermediate layer of metal, and (6) application of an outer layer of metal.

Metals other than silver can, of course, be deposited as well. Copper films can be deposited on plastics by the reduction of a copper solution with formaldehyde or hydrazine. Lead films can be applied using an aqueous solution of the nitrate, acetate or tartrate, reducing with a solution of thiourea in the presence of sodium or potassium hydroxide. Gold films can be formed from an aqueous solution of gold chloride by using invert sugar, alcohol, citric acid or formaldehyde as reducing agents. Nickel films are deposited from nickel carbonyl decomposed at 302° F.

# Heat Treating, Forming, And Welding 75S Alclad

By MITCHELL RASKIN
*Assistant Process Engineer, Northrop Aircraft Inc.*

***. . . In the first part of this article, published last week, the author discussed the metallurgy and heat treatment of the important 75S alloy. In this second and concluding part, he points out the precautions to be observed in forming and spot welding, and describes a method of hot dimpling. Original tests with the resistance heating for dimpling were made by Dan Finch of the University of California. Northrop developed and perfected its use for practical production.***

FORMING properties possesed by 75SO are very similar to those of 24SO, although greater pressures are required and higher springback is encountered due to the higher tensile and compressive properties. Local elongation is also slightly greater than in 24SO. For operations where local forming is involved, such as bending, 75SO has been found equivalent or superior to 24SO, and although it has a tendency to neck prematurely, thus tending to limit the elongation in stretch flanges and lightening holes, the strain required to accomplish the making of most parts is less than the limiting elongation. Hence no difficulty has been experienced in performing such operations in the SO temper. The slightly inferior compression properties of 75SO do not interfere with either drawing or drop hammer operations.

In the as-quenched condition, 75S has forming properties only slightly inferior to those of 24SQ. The elongation is considerably greater up to the point where necking starts, and the high uniform elongation and general resistance to necking make it a very satisfactory material for stretch press forming. Forming in the as-quenched condition is highly desirable since ductility is good, and warpage from subsequent solution heat treatment is eliminated. The age-hardening characteristics, however, make speed in forming an absolute necessity.

After approximately 1 month at room temperature aging, 75SW reaches sufficient stability to enable predictions of formability to be made. The local and uniform elongation is much less than in the SQ temper, but approximates that of 24ST. In general 75SW Alclad has similar forming properties to 24ST Alclad. The great advantage of forming in the SW temper is that the operation is not restricted to a short working period, as in the SQ temper, and the material is still free from subsequent warpage due to heat treatment. There is a possible chance that superheated warehouses or transportation compartments may accelerate the aging of SW and thus reduce its ductility, but after 1 year's use of the material Northrop has not encountered this difficulty.

In the ST condition 75S Alclad possesses a yield strength approaching the ultimate, and it is not uncommon for the yield strength to be 69,000 to 70,000 psi with an ultimate of 78,000 to 80,000 psi. This results in a very small plastic or ductile range. Uniform and local elongation are only two thirds that of 24ST, and springback is very great. Hand forming, hydro press, and most other forming operations are therefore very difficult, but power brake or roll forming may be performed if an adequate bend radius is allowed.

Increased temperature (see fig. 6) lowers physical properties and uniform elongation, but local elongation is considerably increased, thus making bending, joggling and dimpling considerably easier. Forming 75ST Alclad at 350°F may be compared to a hypothetical temper between 75SQ and 75SW. The limiting factor in hot forming is adapting a practical method of heating to the individual part. Some parts may be heated satisfactorily in an oven or oil bath, by calrods in dies, or other conduction heating devices; some can be heated only by resistance heating, while some cannot be adequately heated with any equipment.

In determining the temper at which to fabricate a 75S part, production cost is, of course, the guiding factor. Parts requiring mild forming should be worked in the ST condition whenever possible, since this eliminates the costly heat treating cycle, but if this cannot be done, every effort should be expended to form the part in the SW temper. Parts completed in this condition require only the comparatively

inexpensive, non-warping, aging heat treatment. Should the contours of a part make forming in the SW condition either too difficult or impossible, and the time consumed is short, the work should be done in the SQ temper. If parts cannot be formed in any of the above tempers, the work should be done in the SO condition and checked for straightness after the solution heat treatment. In cases where long slender members are involved, or there are great differences in section, and warpage would be very difficult to remove, the forming should be done hot in the ST temper. In a few cases, parts which suffer little or no warpage may be formed in the SO temper to facilitate speed and ease of manufacture.

### Bending and Forming

75S Alclad, like 24S, has better formability when the direction of forming is across the grain rather than with the grain.

Satisfactory bends at 90° may be made on the power brake or hydro press as shown in tables II and III. The minimum radii shown in these tables may be obtained in production, providing all edges are carefully burred prior to forming, and all scratches, nicks and surface damage are removed by polishing. If rough edges are allowed to remain, even a 6T radius may be inadequate, and it is recommended that burrs be removed by polishing. Table IV gives the maximum allowable depth of scratches, and these values should not be exceeded if failure by cracking is to be avoided. Polishing should always be perpendicular to the bend line.

Bend failures sometimes break in a wavy pattern (See fig. 7), but on many occasions investigations have shown that failure was not due to excessive forming or notches, but rather to the presence of some inhomogeneity in the metal, such as inclusions or abnormally large constituent particles. (See fig. 8). These act as notches, but as they cannot be detected on the surface of the metal a certain amount of scrap is inevitable during bending. The failure shown in fig. 7 was found to be due to a large particle of segregated chromium constituent. Recent improvements in technique on the part of the metal fabricator have, however, reduced the probability of such failures.

Roll forming may be successfully performed in all tempers of 75S, providing the same bend radius limitations specified for bending are followed. For hydro press forming, parts

**TABLE II**

Ratio of the Minimum Bend Radius to Sheet Thickness, 75ST Alclad

| Condition | Thickness, In. | Minimum Bend Radius |
|---|---|---|
| SO | Up to 0.091 | 2T |
| SO | Over 0.091 | 3T |
| A.Q. | All | 3T |
| SW | All | 4T |
| ST | 0.020 and 0.025 | 4T |
| ST | 0.032 and 0.040 | 4.5T |
| ST | 0.051 and over | 5T |

**TABLE III**

Minimum Bend Radii for 75ST Alclad Sheet

| Sheet Thickness | Minimum Bend Radius | | |
|---|---|---|---|
| | SO | SW | ST |
| 0.020 | 0.050 | 0.100 | 0.100 |
| 0.025 | 0.050 | 0.100 | 0.100 |
| 0.032 | 0.100 | 0.150 | 0.150 |
| 0.040 | 0.100 | 0.150 | 0.200 |
| 0.051 | 0.150 | 0.200 | 0.250 |
| 0.064 | 0.150 | 0.250 | 0.350 |
| 0.072 | 0.150 | 0.300 | 0.350 |
| 0.081 | 0.200 | 0.350 | 0.400 |
| 0.091 | 0.200 | 0.400 | 0.450 |
| 0.102 | 0.300 | 0.400 | 0.500 |
| 0.125 | 0.350 | 0.500 | 0.750 |

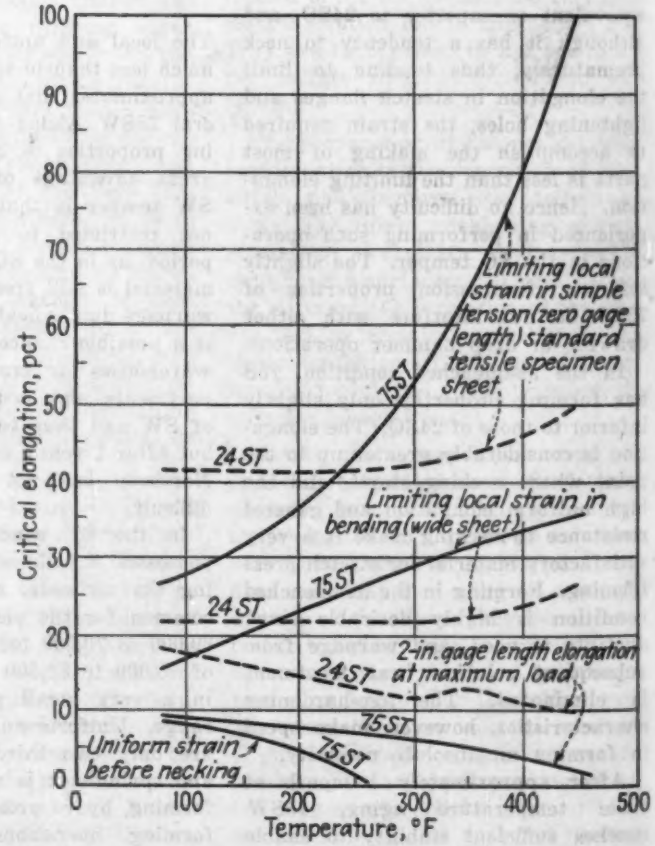



FIG. 6 — Effect of temperature upon critical elongation.

TABLE IV

| Material | Maximum Allowable Depth of Scratch | | |
|---|---|---|---|
| | Parallel to Bend, In. | 20° | 45° to 90° |
| XA75ST | 0.0008 | 0.0015 in. | 0.0025 in. |
| 75ST 0.064 and under | 0.0015 | 0.0025 in. | 0.0035 in. |
| 75ST 0.072 through 0.091 | 0.0020 | 0.0030 in. | 0.0040 in. |
| 75ST 0.102 and over | 0.0025 | 0.0035 in. | 0.0045 in. |

which can be formed in the SO and SQ temper of 24S can likewise be formed in the same tempers in 75S. 75SW, however, behaves much the same as 24ST. Shrink flanges are slightly more difficult to form in 75SQ than in 24SQ, while stretch flanges are less difficult with 75SW than with 24ST. For forming lightening holes also, the SW temper is superior to 24ST. Modified lightening holes and stretch flanges are the only hydro press operations in which 75S can be formed satisfactorily in the ST temper. Spring back from a 90° bend is approximately 2° for the SO temper, 2½° for the SQ temper, and approximately the same as 24ST in the SW temper.

In the SO condition deep recessed, beaded and corrugated parts may be formed by drop hammer operation as readily as 3SO, although some difficulty may be encountered where a great deal of shrinking is required. 75SQ has the same drop hammer characteristics as 24SQ, but neither the W nor the T tempers are satisfactory for this type of operation. A similar relationship between 24S and 75S also exists in punch press operations, although greater loads are required for shearing on account of the higher shear strength of the latter material. In the ST temper some modified lightening holes may be formed on the punch press, but in general its use in this temper for punch press work should be discouraged.

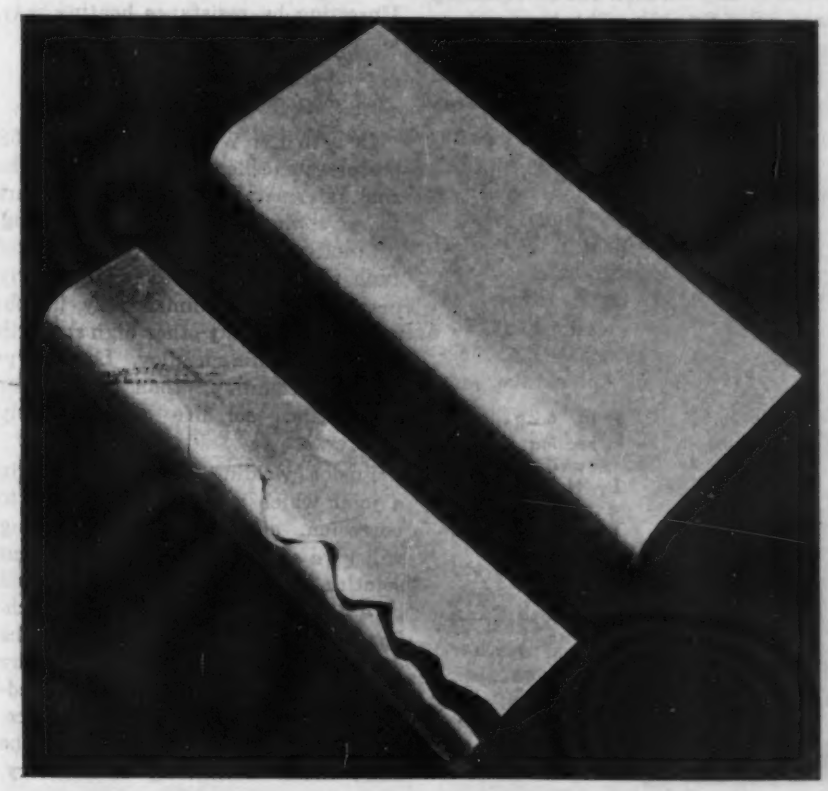
## Dimpling Difficulties

Dimpling offers some serious difficulties since the form of the dimple cannot be modified to suit the temper of the material, but must conform to standard rivet head design, and in most cases a temper cannot be selected to suit the dimpling operation. Almost all dimpling must be done with the material in the T condition. Tools have long since been developed for satisfactory dimpling in 24ST, but these have been found useless when applied to 75ST, and it has been necessary to design entirely new tools. By increasing the punch diameter and the die radius angle, and by enlarging the dimple diameter and angle, and after carefully reaming and burring the rivet holes, cold dimples have been produced, but while these were satisfactory from a structural point of view they were entirely unsatisfactory aerodynamically because of the large dimple radius and the annular gap between rivet and dimple. Experiments carried out by North American with the coin dimple, and by Northrop with the two-stage coin dimple, have produced satisfactory results, but these are limited to certain dimple sizes and gages.

Since it was known that the ductility of 75S could be appreciably improved, without loss of strength, by limited heating, an effort was made to devise methods and equipment for hot forming the dimples. Frictional heating produced by a spinning tool was found to be impractical on account of the time consumed, the bulkiness of the tooling, and the need for considerable skill on the part of the operator. Conduction heating was likewise rejected because it generally requires a heating element which is a part of the punch or die, the time required is too great, there is danger of overheating with resultant annealing, and the high temperature (approximately 600°F) is a safety hazard. Resistance heating was found to be most satisfactory and to produce dimples far superior to the standard 24ST dimple.

Fig. 9 shows the set up of the resistance heating dimpling equipment employed by Northrop, in which an ac spot welding transformer is used as a source of current. The current is fed to hardened beryllium copper, water cooled electrodes into which the hardened tool steel punch and die are inserted. The lower electrode holder is raised above the bottoming ledge by a steel spring, so that when the dies are closed a positive contact is assured between the dies and the aluminum stock. When the spring is compressed ⅝ in., creating a pressure of approximately 85 lb, a switch is tripped, setting off the electronic timer which closes the circuit from the power supply to the transformer. The metal is heated almost instantly,

FIG. 7—Failure in 75ST Alclad 0.091 in. thick, showing the wavy pattern frequently encountered.



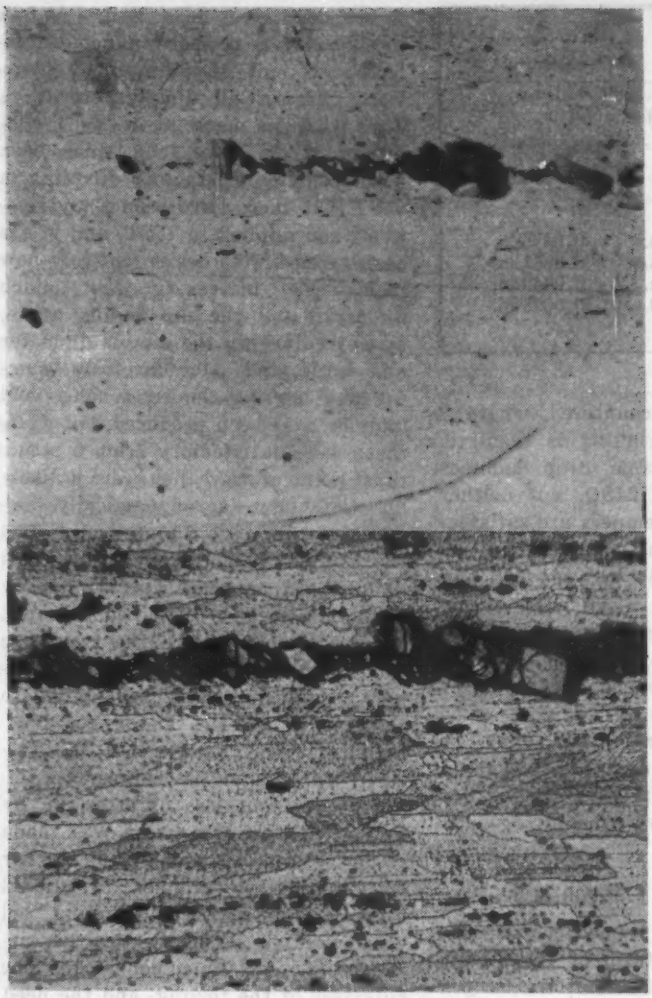


FIG. 8—Segregation of constituent in 75ST Alclad revealed by Keller's etch at 200X.

and the upper die continues to descend until a sharp flush dimple is formed in the ductile metal. The heating current remains on for only a fraction of a second, and is interrupted before the dies open so as to avoid the possibility of arcing and resultant pitting. The current passes first through the edge of the hole, then radially through the surrounding area (See fig. 10). The temperature is thus greatest at the edge of the hole where large stresses occur, and drops very rapidly outside the area where actual contact is made. This is an ideal distribution system since the greatest heat is afforded in the areas where the most severe forming takes place.

Proper timing is important, since if the current is applied too soon arcing may occur, and if too late, the dimple may be partly or fully cold formed and the material damaged. Different transformer and timer settings are required for each combination of dimple size and sheet thickness, and these are supplied in chart form to the machine operators. Sheet to be dimpled should be free of oil, dirt, or paint, but no special cleaning or etching is required. Holes should be burred to prevent aluminum pick-up on tools but no special attention need be paid to hole dimensions or condition. Unfortunately, for the present, hot dimpling is limited to assemblies which can be brought to the resistance dimpling machine. This can be done with almost all exterior skin material, but stringers, frames, and other members which are fixed in permanent jigs must still be cold dimpled.

Resistance dimples in 75S permit the making of riveted joints in which the seated rivet gives the appearance of a machine countersunk rivet joint, and so high are the bearing strengths that a demand has been created for a higher strength rivet to improve joint efficiency. Rivets made from 75ST wire may be developed to serve this need, but the method of upsetting the head is still open to speculation. Upsetting by resistance heating may, however, be a possible solution.

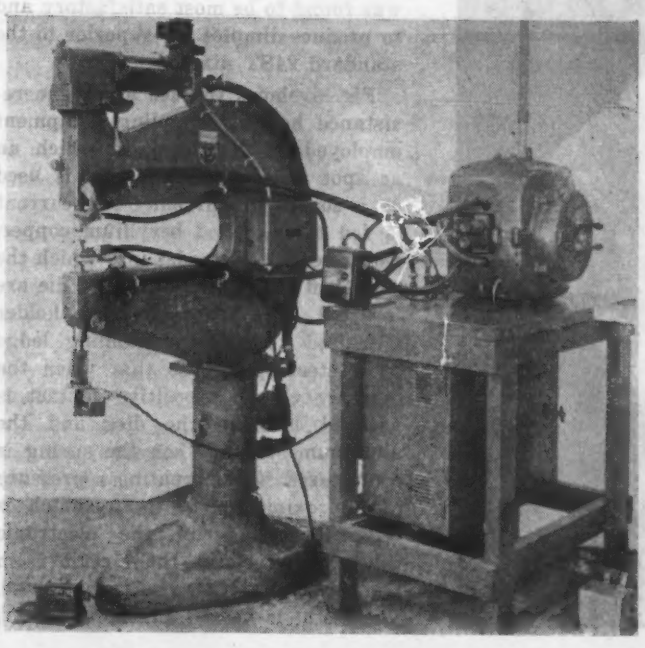


FIG. 9—Resistance heating dimpling machine employed by Northrop, using a spot welding transformer for current supply.

## Machining and Welding

In both the W and T tempers 75S possesses excellent machinability. The zinc intermetallic compound appears to give the metal free machining properties, and with the use of tungsten carbide tools, properly ground, a better finish may be obtained than on any other high strength wrought aluminum alloy. Less warpage is encountered than in 24ST or 14ST, and tool life is appreciably greater.

Fusion welding of 75S results in a joint which is highly susceptible to corrosion, although heliarc welding will give good fusion, and subsequent solution and aging heat treatment will give the joint a strength approaching that of the parent material. The drawbacks of such heat treatment are warpage and weld brittleness, in addition to poor corrosion resistance. Spot welding of 75ST Alclad on the other hand, is entirely satisfactory.

The weld structure is sound, and the shear and tension strength, and the general consistency is above the acceptable standards for 24ST Alclad. The fatigue strength is inferior to 24ST, but the difference is not sufficient to cause any serious concern. Spotwelded specimens of 75ST subjected to 250 hours of salt spray in accordance with AN-QQ-S-91 were found in some cases to have actually increased in strength, which may be attributed to slight aging of the weld heat zone in the spray chamber. The salt spray did not penetrate into or attack the weld nugget.

75ST Alclad has the same tendencies toward porosity, cracking, and flashing or spitting of weld metal as 24ST Alclad when the same improper practices are employed, namely:

(1) Weld current too high in magnitude and too short in duration.

(2) Insufficient welding or forge pressure, or both.

(3) Insufficient electrode cooling of metal during fusion.

(4) Very high rates of increase in current.

The same remedies used for 24ST also apply to 75ST Alclad, but it should be noted that approximately 25 pct higher pressure range is required on 75ST, since insufficient pressure may result in cracks in the cast structure. Burned spot welds should be avoided, due to their susceptibility to corrosion.

In regard to cleaning and etching techniques, 75ST Alclad is much more critical than 24ST, and a longer cleaning and etch time generally gives better results. If the time between etching and welding exceeds five hours the parts should be re-etched. Spot welds on 75ST Alclad may be obtained consistently as good as the best 24ST welds if the proper precautions are observed, and equally good results can be obtained by welding the two metals together.

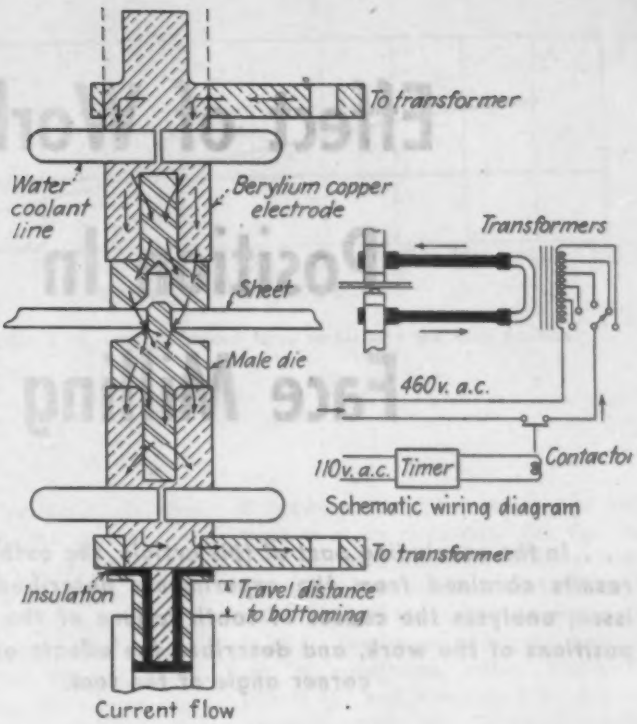



FIG. 10—Diagrammatic sketch of the path of current flow in resistance heating dimpling tools.

## Micro-Spectrographic Method for Steel Segregates

SINCE steel segregate analysis by the spot-spark method gave higher average values for all elements on the segregates than those on the normal metal (*Journal, British Iron and Steel Institute*, 1941, No. II, p. 183P), J. Convey and J. H. Oldfield have selected a different method according to their reports recently presented before the institute.

The elements manganese, molybdenum and vanadium showed the greater percentage increase. Careful examination of the segregate analysis revealed variations in element content within a single segregate. An attempt was made to determine the graduation in composition across a segregate by a careful linear location of the actual points tested. Although the results were good it was resognized that a technique was required whereby a continuous record of the variation in content across a segregate could be determined. A method was developed whereby the sample could be guided under a stationary upper electrode, while the photographic plate on which the spectrogram is recorded moved downwards across the camera aperture of the spectrograph. Spectrograms were obtained on which the spectral lines varied in density over their length according to the local changes in the composition of the specimen along the path of the spark. By means of Meccano parts a system of transmission was designed and built. The speeds of transmission of the sample and the photographic plate were adjusted to give spectrograms of a density similar to that obtained by the spot-spark method.

Tests were made on several well-worked Ni-Cr-Mo steel bars of small section, and the results corroborated the content homogeneity of the bars. Spark traverses of the order of 7 mm in length were made across various segregates in different types of steel and the results calibrated against standard steels. Such exposures produced spectrograms whereon the spectral lines were 5.4 cm long. The clean definition and uniformity of the spectral lines throughout their lengths is a good proof of the continuity and smooth motion of the mechanical functioning of the transverse system. The effect of sparking on the steel samples is a crater very uniform in width (0.4 mm) and depth (0.02 mm) throughout its length (7 mm approximate).

To obtain a quantitative analysis of the steels for carbon a higher steady state potential of the spark gap was required. This was produced by blowing a small blast of dried air across the spark gap (pressure, ½ in. of water). The method was standardized and tested. Analyses of segregates were identical with those obtained with the spot-spark and traverse-spark techniques without air blast. Variations in the macrostructures of segregates were found to agree with the content curves obtained via a traverse on the sample. Carbon content showed a slight decrease across the segregate in Ni-Cr-Mo alloy steels.

# Effect of Work Position In Face Milling

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***. . . In the concluding part of this article, the author evaluates the results obtained from the experiments described in last week's issue, analyzes the causes of tooth failure at the various angular positions of the work, and describes the effects of changes in the corner angle of the tool.***

THE data compiled in fig. 5 quickly indicate that a face milling cutter having a 10° negative axial rake; a 10° negative radial rake; a 15° corner angle, and a 1/32-in. by 45° chamfer:

(1) Gives the longest cutter life when the nose or corner on the cutter enters the cut anywhere between the 70° 45′ and 100° work positions. The reason for this is the point A on the face of the tooth which contacts the work first:

a—A 0.0105-in. feed per tooth gives the longest as well as the most uniformly consistent cutter life between the 70° 45′ and 100° work positions.

b—A 0.0084-in. feed per tooth gives the shortest cutter life, but has a tendency to cover a wider range of work positioning between 63° 45′ and 100°. Evidently the reason for this is the second point of contact with the work, which happens to be at A even though its initial point of contact is at E.

c—The longest cutter life of a 0.0147-in. feed per tooth is confined within the narrowest range of work positioning for the four feeds used.

d—At about the 90° tooth entry position, the cutting edge along the 45° chamfer contacts the entry edge of the work broadside. This actually tends to decrease the length of run by a slight amount. An analysis of all tools run at this position shows that the initial break-down occurs along the chamfer.

(2) The life of the cutter is short and erratic when the cutter nose enters the work first anywhere between zero position and the 63° 45′ angular work position. This is due to the fact that the point E on the face of the tooth, which is below the point where the chamfer intersects the face of the cutter, contacts the work first.

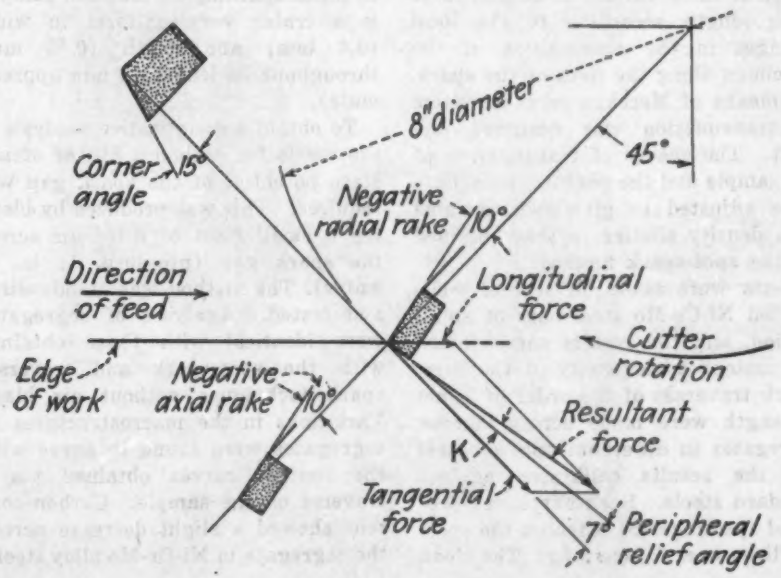
This is substantiated by an analysis of the wear record of all the tools run at these positions, which indicates that a chip out of the cutting edge at E is followed by a complete collapse of the chamfer.

a—It will be noted that a 0.0084-in. feed per tooth shows the longest cutter life, and that the 0.0126 in., 0.0106 in. and 0.0147 in. feeds per tooth, in the order given, show the shortest cutter life between the 0° and 55° work positions.

b—At the 45° angular position, all of the feeds per tooth gave practically a zero cutter life. Plenty of runs were made at this work position to verify the results. There is no indication that this is the result of a change in the type of tooth contact because the same type of contact exists all the way from the 0° to the 63° 45′ angular position.

An analysis of the wear record of all the tools which were run at the 45° position showed that the cutting edge in the vicinity of the intersection of

FIG. 17—Graphical analysis of direction of resultant tooth impact force at 45° position.



the corner angle and the chamfer consistently failed by spalling off in the same manner. It was assumed that this was due to the direction of, and also the intensity of, the impact load at the time the tooth hit the work. To verify this, an analysis was made of the major cutting forces at the time of the initial tooth impact, using the assumption that the longitudinal force, in the direction of feed, is 30 pct of the tangential force, as outlined in fig. 17.

This type of analysis was applied to each work position from the zero position to the 90° position. The angle K, which gives the relationship of the resultant force to the peripheral relief angle behind the cutting edge for each one of the various work positions, was determined graphically and then plotted as shown in fig. 18.

It will be noticed that for the 45° position, which is shown in fig. 17, the resultant force line lies 3° 30′ within the peripheral relief angle line. It will also be noted that the angle K is zero for a work position of 32°. This means that the direction of the resultant force coincides with the peripheral relief angle behind the cutting edge. This also means that for all work position angles which are less than 32°, the direction of the resultant force lies outside the peripheral relief angle and shows why

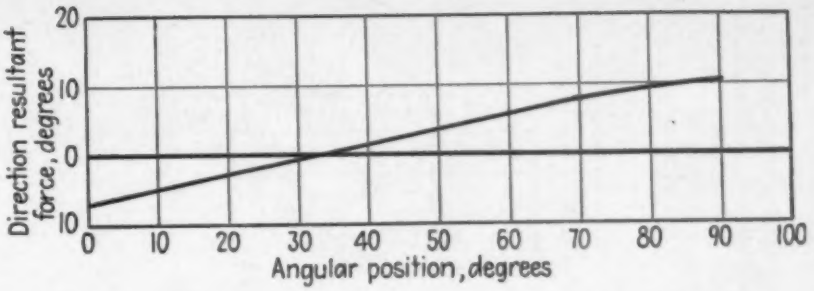



FIG. 18—Direction K of resultant impact force varies with the work position.

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there is an inclination to spall off behind the cutting edge.

c—There is a tendency for cutter life to decrease slightly at the 63° 45′ work position. This is apparently due to the fact that at this position, the entire cutting edge along the corner angle enters the work at the same time, thus causing a momentary increased shock, which tends to break down the cutting edge.

d—At the 70° 45′ work position, the face of the cutter tooth contacts the work at both A and E at exactly the same time. This momentarily increased contact also has a tendency to reduce cutter life by a slight amount.

## Arc of Contact Changes

It is a known fact that when work is so positioned in relation to a face mill that the center line of the work and the center line of the cutter, measured in the direction of the feed, actually coincide, the arc of contact B between the cutter tooth and the work is at its minimum. See fig. 19. This arc of contact increases gradually as the work position is shifted either side of this central position. It is at its maximum under the present set of conditions, either where E equals 10° and F equals 0.061 in., or where E equals 127° 33′ and F equals 6.437 in., as shown in fig. 1.

Table I shows the length of this arc of contact B expressed in inches for the various work positions for the 1½-in. width of cut which was used in the test runs. This arc of contact (tooth path) has been called by the mathematical term "an arc of a looped trochoid." Since the width of cut is narrow, however, it will be treated here as an arc of the cutter circumference. This will give a close approximation to the theoretical curve already mentioned.

Table I also shows the total length of these arcs of contact expressed in feet for a 1-in. length of cut for the various work positions w[illegible]n using an

TABLE I

| Angular Position of Entrance Point on Work, E, in Degrees | Length Arc of Contact Tooth Makes With Work, B, in In. | | | Total Length Arc of Contact Tooth Makes With Work for Each Inch Length of Cut, in Ft. | | | Pct Total Length of Arc of Contact With Work Using Position of Minimum Contact as 100 Pct | | |
|---|---|---|---|---|---|---|---|---|---|
| | W = 1 in. | W = 1½ in. | W = 2 in. | W = 1 in. | W = 1½ in. | W = 2 in. | W = 1 in. | W = 1½ in. | W = 2 in. |
| 5 | 2.565 | 3.253 | 3.857 | 25.43 | 32.20 | 38.25 | 256 | 215 | 191 |
| 10 | 2.278 | 2.960 | 3.560 | 22.58 | 29.40 | 35.31 | 227 | 197 | 177 |
| 20 | 1.843 | 2.487 | 3.066 | 18.27 | 24.66 | 30.40 | 184 | 165 | 152 |
| 30 | 1.534 | 2.136 | 2.690 | 15.21 | 21.15 | 26.67 | 153 | 142 | 133 |
| 40 | 1.322 | 1.884 | 2.414 | 13.11 | 18.65 | 23.93 | 132 | 125 | 119 |
| 50 | 1.178 | 1.708 | 2.219 | 11.68 | 16.90 | 22.01 | 117 | 113 | 110 |
| 60 | 1.065 | 1.593 | 2.084 | 10.56 | 15.83 | 20.77 | 106 | 106 | 104 |
| 70 | 1.028 | 1.528 | 2.031 | 10.19 | 15.16 | 20.14 | 102 | 101 | 100 |
| 75-31-22 | ..... | ..... | 2.021 | ..... | ..... | 20.04 | ... | ... | 100 |
| 79-11-35 | ..... | 1.509 | ..... | ..... | 14.96 | ..... | ... | 100 | ... |
| 80 | 1.004 | 1.509 | 2.028 | 9.95 | 14.96 | 20.11 | 100 | 100 | 100 |
| 82-49-09 | 1.002 | ..... | ..... | 9.94 | ..... | ..... | 100 | ... | ... |
| 90 | 1.011 | 1.535 | 2.094 | 10.02 | 15.24 | 20.77 | 101 | 102 | 104 |
| 100 | 1.052 | 1.625 | 2.258 | 10.43 | 16.06 | 22.40 | 105 | 107 | 112 |
| 110 | 1.138 | 1.802 | 2.609 | 11.28 | 17.83 | 25.86 | 113 | 119 | 129 |
| 118-58-17 | ..... | ..... | 3.552 | ..... | ..... | 35.23 | ... | ... | 176 |
| 120 | 1.298 | 2.167 | ..... | 12.87 | 21.50 | ..... | 130 | 144 | ... |
| 127-32-39 | ... | 2.954 | ..... | ... | 29.25 | ..... | ... | 195 | ... |
| 130 | 1.821 | ..... | ..... | 18.08 | ..... | ..... | 182 | ... | ... |
| 137-18-15 | 2.278 | ..... | ..... | 22.57 | ..... | ..... | 227 | ... | ... |

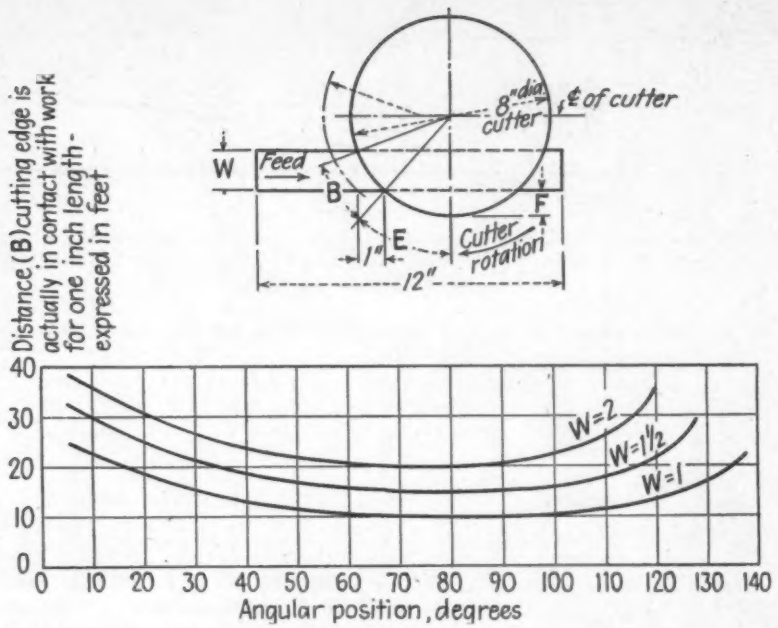



FIG. 19—Analysis of length of tooth path through work when considering work width and position.

0.0084 in. feed per tooth. This is obtained by multiplying the length of the arc of contact for one tooth pass by the number of tooth engagements, with the work in a 1-in. length of cut for the given feed per tooth. (This is expressed in feet to reduce the number of digits in the figures.) The following example shows the method used to arrive at the total length of arc of tooth contact with the work for each inch of length of cut when using the 80° work position and the 1½-in. width of cut:

$$\frac{1.509 \text{ (length of arc of contact)} \times 238 \text{ (rpm.)}}{2 \text{ (in. per min.)} \times 12 \text{ (in. to ft.)}} = 14.96 \text{ ft.}$$

The lengths given in table I were compiled for the several work positions and the graphs shown in fig. 19 was plotted from them. This graph shows that there is a marked difference in the distance which a cutter tooth has to travel as the work position changes from either side of the central position where the center line of cutter and center line of work coincide.

This information is also expressed on a percentage basis, using the position where the arc of contact is the shortest, as at 100 pct.

In order to determine the effect of the changing of the width of the work on the length of arc of tooth contact with the work, similar data were compiled for both 1-in. and 2-in. cuts.

Using the data compiled for the 1½-in. wide cut in table I and shown in the graph in fig. 19, a new set of tool curves as shown in fig. 20 was developed to take the place of those shown in fig. 5. This was done by multiplying "the distance traveled to tool failure" expressed in inches, by the "total length of arc of contact with the work for each inch length of cut" expressed in feet, and plotting the result against the various work positions.

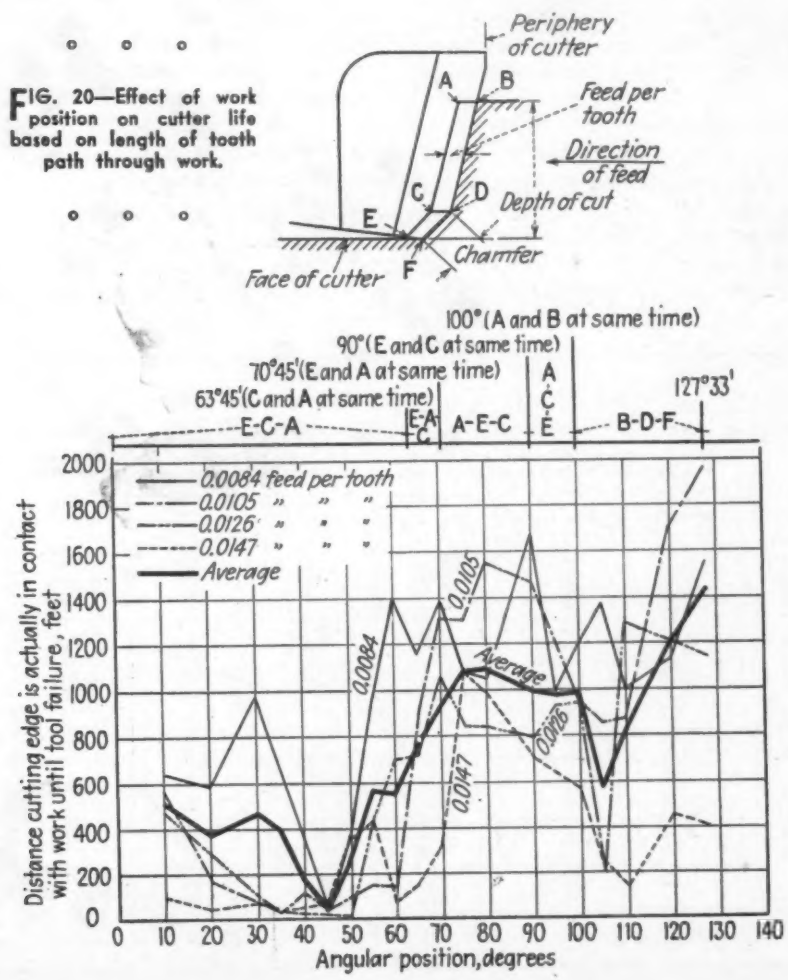
This set of curves follows the same general pattern as those shown before in fig. 5, and these curves:

(1) Amplify the point that at both the low and the high angular work position, the rapid failure of the cutting edge on the cutter tooth is accentuated by the increased distance that it is actually in contact with the cut.

(2) Clearly show that they are the critical work positions at 45° and 105°.

(3) Also show the effect of the tooth engagement with the work at the 63° 45'; 70° 45'; 90°, and the 100° work positions in about the same manner as when rated on the actual distance traveled to point-of-tooth failure.

FIG. 20—Effect of work position on cutter life based on length of tooth path through work.




## Effect of Corner Angle

It frequently happens that the outline of the work piece, where the cutting edge first contacts it, is of such a shape that a corner angle other than 15° is required to keep the corner of the cutter from hitting the work first.

Fig. A in fig. 21 shows a condition

where a cutter tooth, having a 15° corner angle and a small chamfer, contacts the work first next to the face of the cutter. This naturally results in short cutter life because the intersection M of the chamfer at the face of the cutter usually chips out first.

Fig. B in fig. 21 shows the same work outline. However, the cutter tooth has been reground to an increased corner angle of 45° which takes the initial contact with the work at some point N at a distance from the intersection of the corner angle and the chamfer. This slight change of conditions prolongs the life of the cutter.

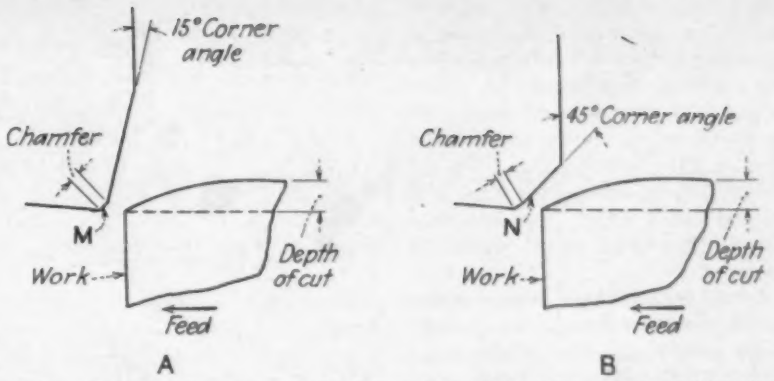



FIG. 21—Changing the corner angle has a beneficial effect on cutter life, since it reduces the tendency to chip at the chamfer intersection.

o o o

When all the data from the test runs made with a face mill having a 15° corner angle used on work with a square corner (90° included angle) had been compiled, it was learned that the best work position angles were between 70° 45′ and 100°. The analysis of the 1/32 in. by 45° chamfer angle showed that the best work position angles for a 45° angle were between 90° and 100°.

The same analysis also showed that the high limit of this range of best work position angles was always a constant for a given negative radial rake angle on a cutter, and was equal to 90° plus the negative radial rake angle on the cutter, irrespective of the corner angle.

The analyses showed that the low limit of this range of the best angular work positions is at the work position angle where the initial point of contact of the face of the cutter tooth and the work begins at M, in fig. 21. A change in the corner angle on the cutter changes the angular work position where the initial contact at the point A, which was shown previously in fig. 5, actually begins. For a 15° corner angle, the work position is 70° 45′. For a 45° corner angle, the angular work position is 90°.

All tests made while using the cutting angles of 15° corner angle, 10° negative radial rake, and 10° negative axial rake clearly indicated that the cutter life would tend to be at its lowest whenever the initial tooth contact with work would be at an angular position of 70° 45′ or less. This forces the work positions which gave the longest cutter life into the narrow operating band between 70° 45′ and 100° angular positions, as indicated by the curve marked 0.0105 and which was previously shown in fig. 5. This same curve also shows practically no cutter life for all angular positions of 60° or less.

The last mentioned conditions offer a real challenge and so a series of 60 runs were made with 40 tools while using increased corner angles to determine some means whereby the cutter life in general could be improved. The tools used were ground as follows: 14 tools to a 25° corner angle; 13 to a 35°; and 13 to a 45° corner angle. All other tool angles were kept the same as were ground on the tools which had the 15° corner angle, except for those tools with the 45° corner angle. In this case, no chamfer was ground between the corner angle and the face of the cutter. Instead, it was broken lightly with a 320-grit silicon carbide stone. A total of 20 runs were made for each set of tools which had the same corner angle, while using the work positions ranging between 10° and 90°.

All the operating conditions were duplicated while using a table travel of 2½ in. per min (0.0105 in. feed per tooth). The distance traveled in in. per min up to the time of tool failure was plotted for each one of the various work positions and corner angles as shown in fig. 22. The tool life curve, previously shown as fig. 5, for the same feed per tooth when using a 15° corner angle was also duplicated.

## Conclusions Reached

A comparison of the four curves shows that for a face mill having a 10° negative radial rake and a 10° negative axial rake and operated under the conditions already outlined:

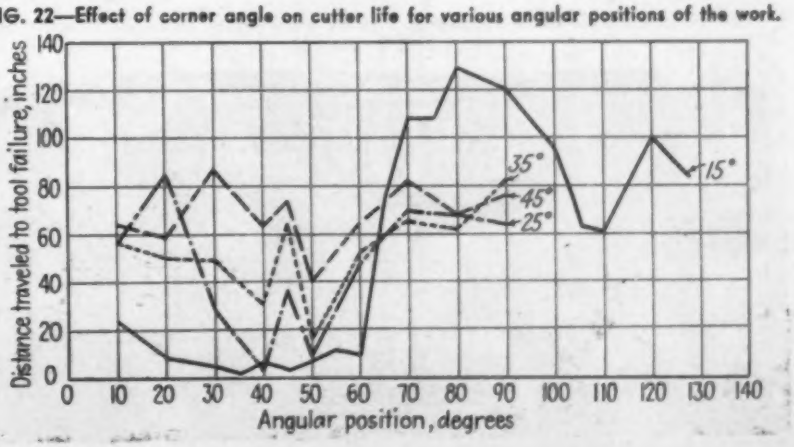
(1) Cutter life reaches maximum when a 15° corner angle is used. The only way this maximum cutter life can be obtained is by using special care to see that the initial point where the tooth enters the work lies between the 70° 45′ and the 100° work positions.

(2) The limited long-life working range between the 70° 45′ and the 100° positions when using a 15° corner angle makes it necessary for the face mill to overhang the entrance side of the work by an increased amount. This results in the use of face mills slightly larger in diameter than have been ordinarily used on most face milling jobs.

(3) Cutter life is at its minimum with a 15° corner angle when the initial point where the tooth enters

o o o

FIG. 22—Effect of corner angle on cutter life for various angular positions of the work.



sired feed and the other slightly below. Which one is to be used is a matter of choice. In like manner the 0.100-in. feed would be determined from the reversed back gear chart indicating the use of the 44/36 change gears, while the 0.006 in. feed must be determined from the normal chart which indicates that the 21/59 change gears would be required.

In setting up these change gears in the machine it must be remembered that the proper back gears must be installed. In the 8-in. machine these back gears consist of a 25/55 change gear combination.

When they are used with the 25-tooth gear as a driver they are installed in their normal relationship, whereas using the 55-tooth gear as the driver is to install them reversed. These same combinations are used on the other sizes of machines, except the 16 23-in. eight-spindle machine which is supplied with different change gears. However, the 8-in. chart does not apply to the other sizes because the intermediate gearing in each drive has been modified to compensate for the character of the work that each size of machine is to perform. The larger the machine, the heavier the cut that it will be required to make. In order to compensate for this, the machine is geared down for a slower feed while using the same change gears as a smaller machine. This difference varies with the size of the machine.

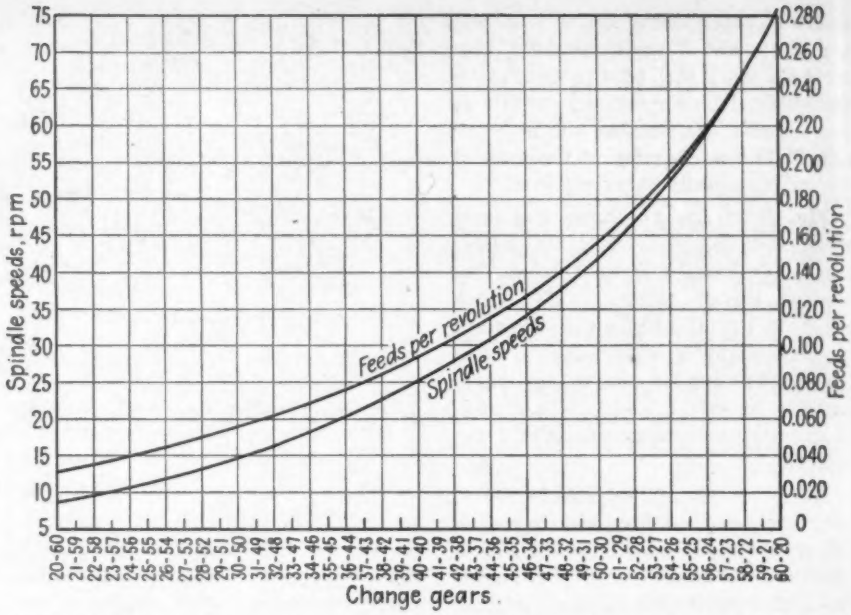



FIG. 10—Chart of feeds and speeds for eight-spindle, Type D, 16-in. to 23-in. Bullard Mult-Au-Matics with back gears reversed.

# New Uses for Hardsteel

MAKING possible the drilling of hardened steel, a new type of drill was introduced some four years ago under the name of Hardsteel.* It proved to be of tremendous value both as a production tool and as a means of salvaging parts which would otherwise have had to be scrapped, and as such found wide acceptance, particularly in aircraft engine manufacturing plants.

* THE IRON AGE, *issue of Feb. 26, 1942.*

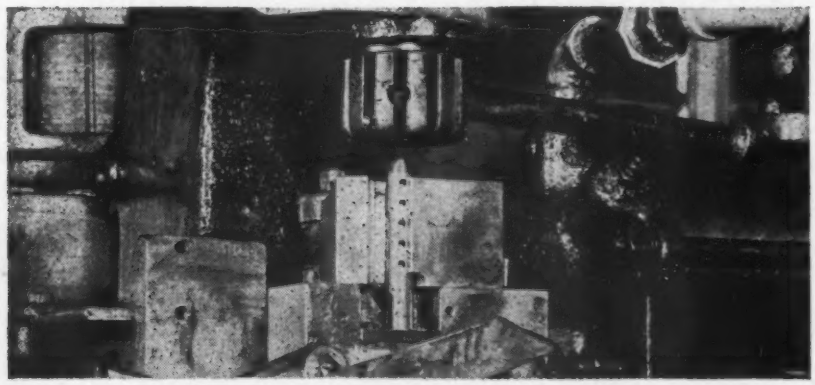
More recently, according to F. G. Gepfert, president of Black Industries, Cleveland, a Hardsteel cutting tool has been introduced for use in the middle-range machining of all types of ferrous and nonferrous alloys on virtually any type of machine tool from planer to automatic screw machine. Said to possess exceptionally high red-hardness, this material will take very heavy cuts at high speeds, and is particularly adaptable to heavy roughing cuts where considerable scale is encountered. It is said to stand up well under intermittent cuts, and due to its high abrasion acceptance it does a particularly fine job on nonferrous metals.

An example of the ability of these tools to stand up under hard use is found in the case of a manufacturer of lock nuts producing parts from X-1350 steel bar 21/32 in. in diam, on an automatic screw machine. The tool used was ⅜ in. square, taking a cut of 3/16 in., with a feed of 0.010 in. at 1050 rpm. A side clearance angle of 6° was used, with a front clearance of 6°, side rake 4°, and zero back rake. For the roughing operation this tool produced an average of 2400 pieces a day with only one regrind per day.

Still another use for this material has been found in its employment for spinning dies for the cold spinning of nonferrous metals. A Hardsteel spinning die having a diameter of 1 in., a height of ⅝ in., with a 0.540 in. cavity was inserted in a holder on the spindle of a drill press, fig. 1. The work piece was a tube of half-hard brass approximately 4 in. long, and it was desired to completely fuse one end to a depth of approximately ¼ in. The work was inserted in an air vise and automatically fed into the die turning at 2000 rpm.

Loading and unloading of the piece was done by hand, and no lubricant was employed on either the die or the work. The time per piece was approximately 5 sec; 2 sec for spinning and 3 sec for handling, resulting in a minimum production of 720 pieces per hr. Life between grinds for Hardsteel averaged 48 hr.

SETUP of spinning die on a standard drill press, showing die enclosed in holder and work held in air vise.



# Cycle Annealing Of Hypo-Eutectoid Steels

***. . . Some complex alloy steels are difficult to condition for machining and cold working. A heat treatment is outlined which cuts down conditioning time. Pre-normalizing is beneficial in obtaining desired spheroidized structure. A method for insuring proper austenitizing temperature is also proposed.***

By G. R. BROPHY

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*International Nickel Co., Inc.,*
*Research Laboratory, Bayonne, N. J.*

THE reluctance of some of the more complex alloy austenites to transform during continuous cooling is so great that to soften them adequately for machining and other cold-work operations by the old conventional methods involves rates of cooling so low that many days are required to complete the cycle. Even then, transformation to soft products may not be complete.

However, by applying the principles of subcritical isothermal transformation, first enunciated by Bain and Davenport, complete transformation to soft products may be attained usually in a relatively short time. Furthermore, this process may be accelerated with even better results by taking advantage of the influence of nucleation, heterogeneity, and grain size. The study of these factors in connection with cycle annealing of steel was initiated in the research laboratory of the International Nickel Co. early in 1941 and the resulting principles developed and described in the present article have been applied commercially with success.

Payson, in a series of articles, has described his methods and presented rules governing the individual steps of treatment. These, in some cases, were too broadly stated, however, to insure the desired results. For instance, his rule No. 2 requires austenitizing "at a temperature usually less than 100°F over the critical" ($Ac_1$) temperature. If followed in some hypo-eutectoid steels, the $Ac_1$ temperatures would be exceeded which would defeat the requirement of austenite heterogeneity. The reason for this is that he referred his austenitizing temperature to the $Ac_1$ temperature which not only varies from heat to heat, but is also dependent upon heating rate. As usually determined, the $Ac_1$ temperature in a variety of steel types may be from 40° to 100°F above the true $A_1$ temperature and, because of this hysteresis, to austenitize above $Ac_1$ at all is to austenitize completely, if the heating time is extended as it must be in large masses.

To insure heating for austenitizing within the critical range and the production of a heterogeneous austenite which will spheroidize most readily upon isothermal transformation the following procedure has been used:

The critical range is determined

*See "The Annealing of Steel" by Peter Payson,* THE IRON AGE, *June 24; July 1, 8, 15, 22, 1943.*

TABLE I

Critical Ranges of Several Hypo-Eutectoid Alloy Steels; Determined by the Reheat and Quench Method

| Steel, SAE | $A_1$, °F | $A_3$, °F |
|---|---|---|
| T1340 | 1275 | 1375 |
| 2340 | 1225 | 1325 |
| 3045 | 1300 | 1375 |
| 3140 | 1275 | 1400 |
| 4640 | 1250 | 1400 |
| 4340 | 1275 | 1375 |

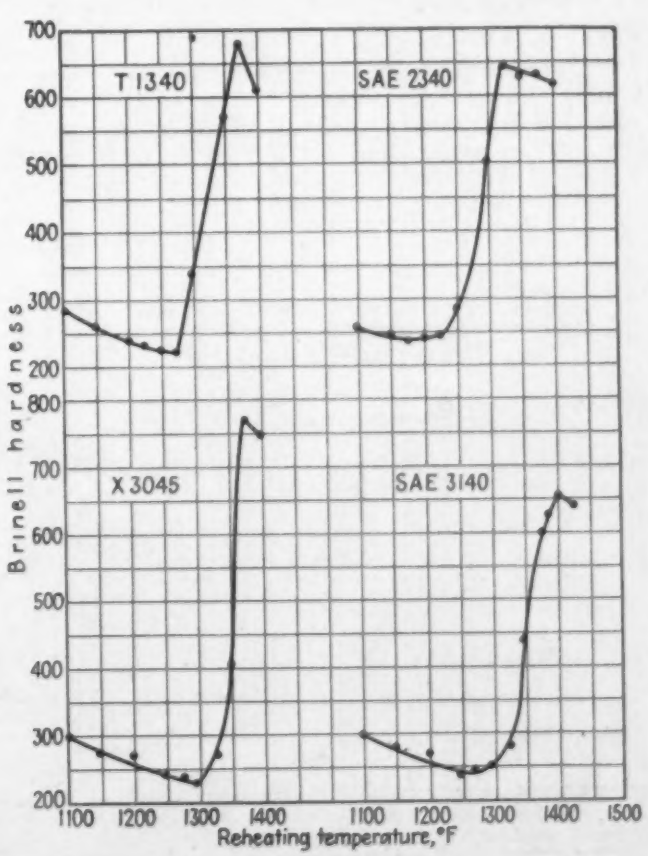



FIG. 1 — Critical points indicated by quenching and reheating.

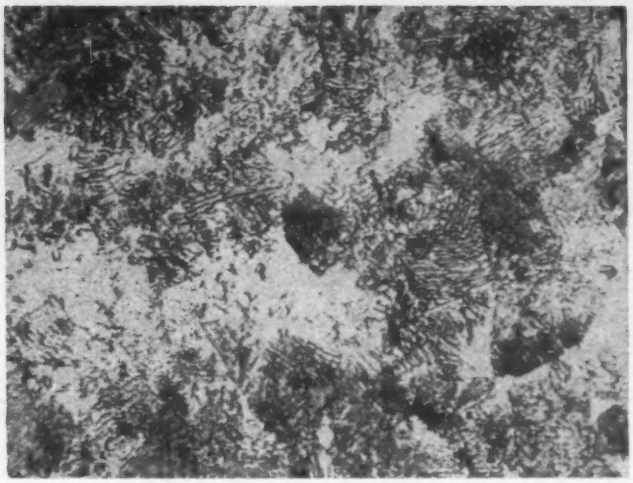


FIG. 2—SAE 4340 steel, slowly cooled from 1525°F. Structure composed of lamellar pearlite and ferrite in bands. Bhn 216; X 1000.

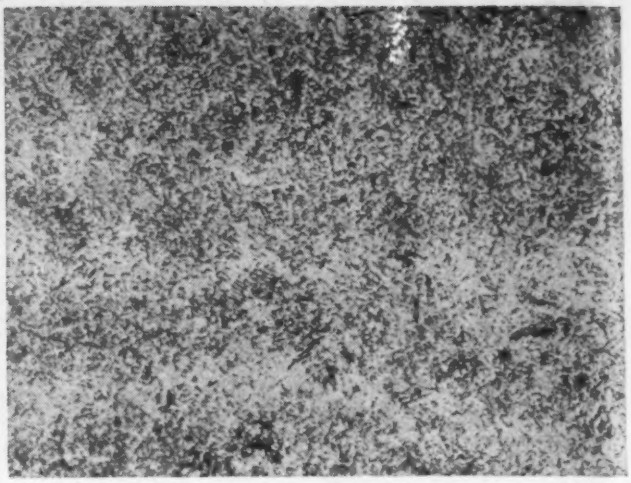


FIG. 3—Same steel as fig. 2, as rolled, austenitized at 1375°F, cooled rapidly to 1250°F, held 24 hr and then air cooled. Bhn 196; X 1000.

by hardening a group of small specimens in the normal manner, and then reheating individual specimens for 5 hr at each of a series of temperatures spanning the critical range and quenching after each heating. This develops a hardness-temperature curve which usually shows a sharp hardness minimum at the $A_1$ temperature and a maximum at the $A_3$ temperature. The steel should be austenitized at a temperature located at 80 to 100 pct of the interval between the $A_1$ and $A_3$ temperatures so located.

A group of such curves is shown in fig. 1. The critical temperatures for a number of steels determined in this manner are shown in table I.

Isothermal decomposition to spheroidite may be accomplished according to Payson's rule by transforming the austenite "at a temperature usually less than 100°F below the critical," but experience has taught that a temperature just above the nose of the Time - Temperature - Transformation, or S, curve is best. The times for decomposition theoretically need be only as long as those indicated by the T-T-T curves to be sufficient, but again experience has taught that a generous additional time should be allowed to accommodate heat to heat variations. A more specific statement of the procedure which has been found to yield improved results is, to heat for austenitizing at a temperature located at 80 to 100 pct of the temperature interval between the true $A_1$ and $A_3$ temperatures and transform at a temperature just above the nose of the T-T-T curve.

The microstructure of the steel received for conditioning may vary considerably, and, as a result, the response to the softening treatment described may vary. To insure the best

## TABLE II

Machinability Test Results

| Steel SAE | Composition C | Mn | Ni | Cr | Mo | Treatment: Normalize Temp., °F | Normalize Time, Hr | Austenitize Temp., °F | Austenitize Time, Hr | Transformation Temp., °F | Transformation Time, Hr | Bhn | Machining: Speed FPM | Machining: Tool Life, Sec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2340 | 0.40 | 0.67 | 3.30 | ..... | ..... | ..... | ..... | 1500 | 2 | Slowly | cooled | 185 | 130 | 210 |
| | | | | | | ..... | ..... | 1325 | 1 | 1100 | 10 | 212 | 132 | 464 |
| | | | | | | 1475 | 1 | 1325 | 1 | 1100 | 10 | 202 | 132 | 702 |
| 4340 | 0.43 | 0.66 | 1.80 | 0.70 | 0.26 | ..... | ..... | 1550 | 2 | Slowly | cooled | 216 | 130 | 60 |
| | | | | | | ..... | ..... | 1375 | 2 | 1250 | 24 | 196 | 132 | 293 |
| | | | | | | 1550 | 2 | 1375 | 2 | 1250 | 24 | 195 | 132 | 843 |
| 3045 | 0.48 | 0.84 | 0.75 | 0.80 | ..... | ..... | ..... | 1525 | 2 | Slowly | cooled | 233 | 132 | 210 |
| | | | | | | ..... | ..... | 1375 | 2 | 1200 | 2 | 207 | 132 | 94 |
| | | | | | | 1500 | 2 | 1375 | 2 | 1250 | 10 | 196 | 132 | 700 |
| | | | | | | 1900 | 2 | 1375 | 2 | 1250 | 10 | 207 | 132 | 450 |
| 4640* | 0.42 | 0.66 | 1.78 | ..... | 0.30 | ..... | ..... | 1500 | 2 | Slowly | cooled | 196 | 132 | 103 |
| | | | | | | ..... | ..... | 1375 | 2 | 1150 | 24 | 187 | 132 | 400 |
| | | | | | | 1500 | 2 | 1375 | 2 | 1150 | 24 | 192 | 132 | 412 |
| | | | | | | 1500 | 2 | 1375 | 2 | 1200 | 24 | 187 | 132 | 854 |
| | | | | | | 1500 | 2 | 1375 | 2 | 1225 | 24 | 186 | 132 | 323 |
| T1340 | 0.41 | 1.79 | ..... | ..... | ..... | ..... | ..... | 1500 | 2 | Slowly | cooled | 207 | 132 | 110 |
| | | | | | | ..... | ..... | 1375 | 2 | 1200 | 10 | 196 | 132 | 245 |
| | | | | | | 1500 | 2 | 1375 | 2 | 1200 | 10 | 179 | 132 | 888 |
| | | | | | | 1500 | 2 | 1375 | 2 | 1225 | 24 | 184 | 132 | 1500 |
| 3140 | 0.44 | 0.79 | 1.40 | 0.68 | ..... | ..... | ..... | 1500 | 2 | Slowly | cooled | 207 | 132 | 43 |
| | | | | | | ..... | ..... | 1425 | 2 | 1250 | 2 | 196 | 132 | 300 |
| | | | | | | 1450 | 2 | 1375 | 2 | 1250 | 15 | 174 | 132 | 600 |

* Only annealed stock available.

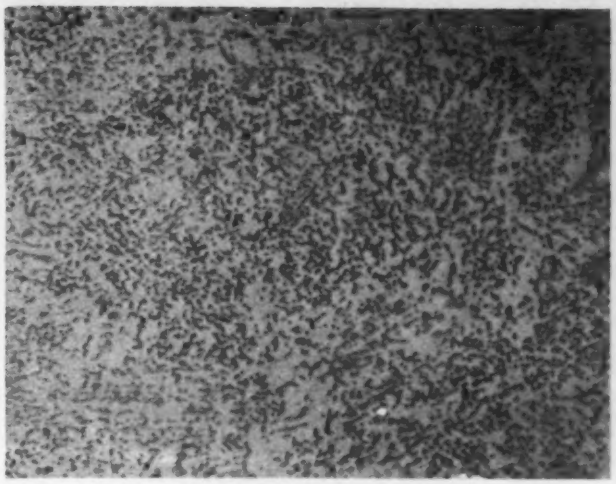


FIG. 4—Same steel as fig. 2, normalized from 1550°F, austenitized at 1375, cooled rapidly to 1250°F, held 24 hr and air cooled. Bhn 192; X 1000.

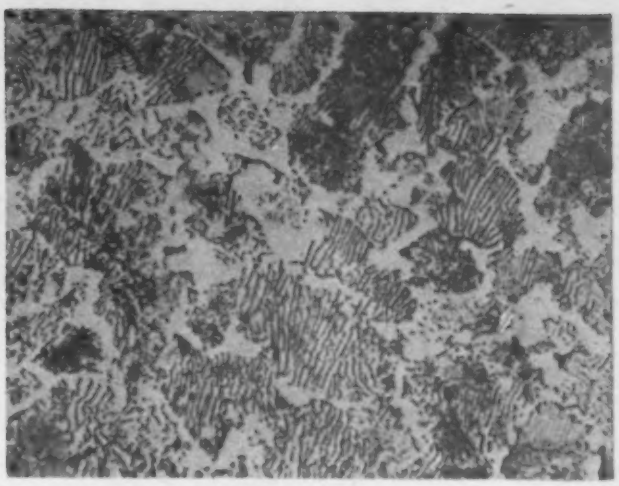


FIG. 5—SAE T1340, slowly cooled from 1500°F. X 1000.

results, it is recommended that all hypo-eutectoid steels be pre-normalized from a temperature just above their respective $Ac_3$ temperatures to obtain a minimum grain size and structural homogeneity. The small grain size persists through the subsequent austenitizing and softening treatments and accelerates the final spheroidization so that the resulting structures are characterized by a uniform dispersion of fine spheroidite in a matrix of ferrite.

The benefit of the complete treatment including pre-conditioning is shown in the group of micrographs of SAE 4340 steel, figs. 2, 3, and 4. The structure of the steel annealed by conventional methods is shown in fig. 2 and is composed of lamellar pearlite and bands of ferrite. When austenitized at 1375°F and transformed for 24 hr at 1250°F the structure, fig. 3, consists of poorly formed spheroidite and some lamellar pearlite. A slight degree of ferrite banding is still in evidence. On the other hand when the steel is pre-normalized at 1550°F and then softened as before, the structure is free from banding and is ideally spheroidized as shown in fig. 4.

A similar series for SAE T1340 steel is shown in figs. 5, 6 and 7 and other steels have been found to respond in the same manner.

Lathe-turning machinability tests were run on a number of steels conditioned by the three methods discussed. Test bars varying from 1½ to 2½ in. diameter were treated and tested in a heavy duty lathe with one end chucked and the other supported by a live center. A steady rest was mounted behind the bar just ahead of the tool and travelled with it. A cleanup cut was first taken on each bar to remove scale and decarburized metal before starting a test.

Test cutting was done dry with ⅝-in. tool bits of the 18-4-1 type of high-speed steel ground to a standard shape in a specially constructed grinder. Tools were mounted in a special rigid holder. Tests were conducted at 130 and 132 fpm with a depth of cut of 0.050 in. and a feed of 0.024 in. Tool lives were measured by means of a stop watch and were reported in seconds. The end point of each test was determined visually and was sharply marked by a change from a satiny to a glazed surface on the shoulder of the cut. Test data are shown in table II.

The machinability results demonstrate:

(1) The benefit of pre-normalizing and hypo-eutectoid steel.

(2) The importance of the choice of a low normalizing temperature.

(3) The importance of the correct choice of austenitizing temperatures, decomposition temperatures and times.

FIG. 6—Same steel as fig. 5, austenitized at 1375°F, cooled rapidly to 1225° and held 10 hr. X 1000.

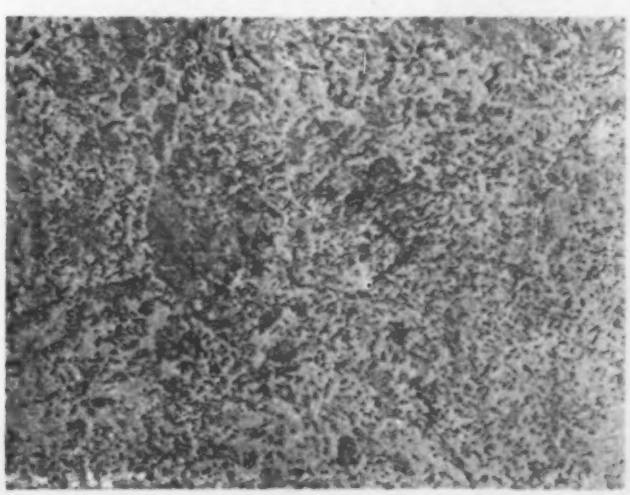
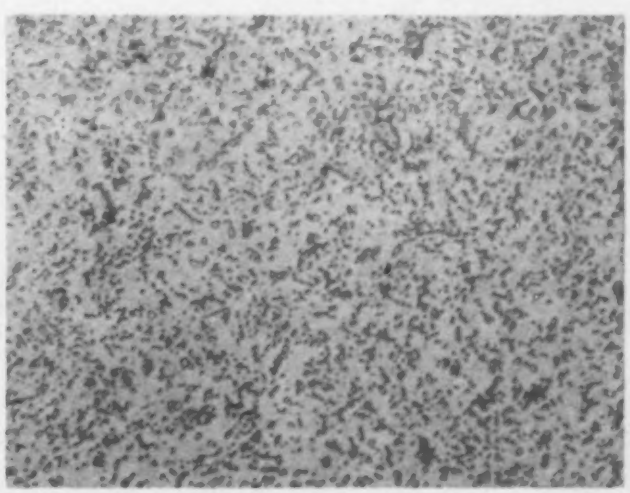


FIG. 7—Same steel as fig. 5, pre-normalized from 1500°F, austenitized at 1375°F, cooled rapidly to 1225° and held 10 hr. X 1000.



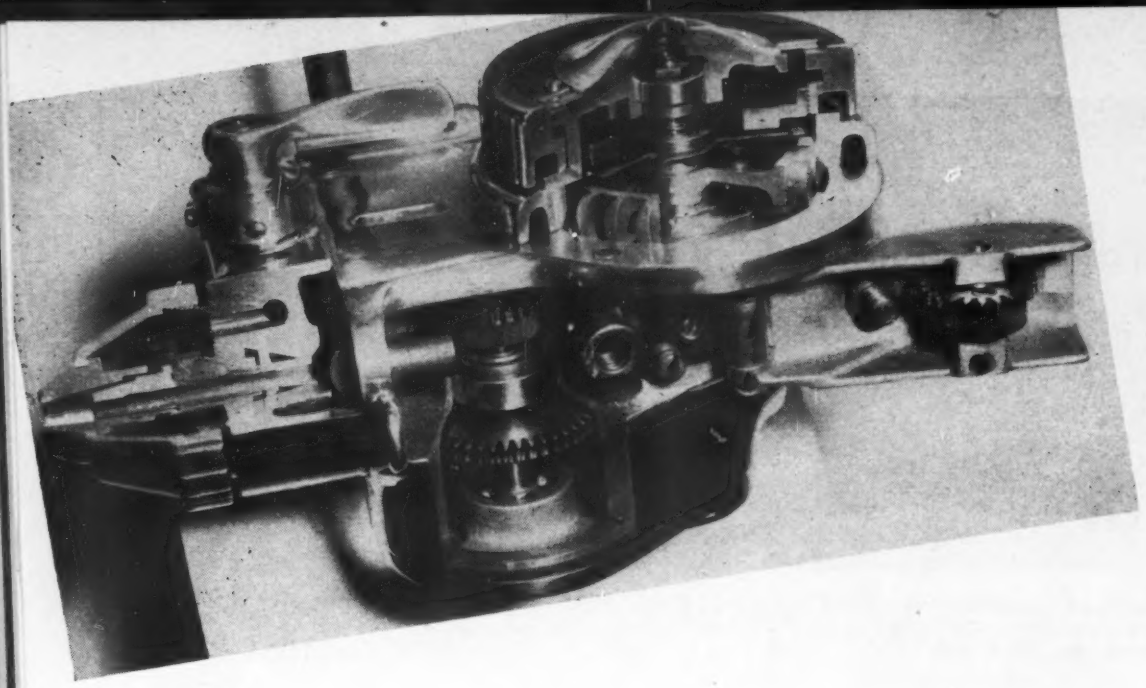


FIG. 1—A cutaway section of the new production type spray gun showing details of the nozzle and the turbine governor.

# . . . Metallizing as a Production

LONG in use as a salvage and repair process, metallizing became during the war a production method of the utmost importance. One of the first applications of continuous operation was in the aluminum spraying of aircraft engine cylinder fins, and it was here, and in other subsequent continuous operations, that it was realized that the equipment then in use was not suitable for this type of work. Spray guns were of the hand, or pistol type, and while various ingenious mounts were devised, these did not compensate for the fact that the gun itself was designed specifically for hand operation over relatively short periods, and that therefore its working parts were necessarily of light construction in order to keep the overall weight to a minimum and relieve operator fatigue. In consequence, gears, feed rolls, and other parts wore out with distressing frequency when subjected to nonstop, 24-hr operation.

Despite these drawbacks, however, the number of applications of continuous operation continued to grow, and spread into many interesting and original fields. In the manufacture of Thermopane, for example, Libby-Owens-Ford Glass Co. sprayed a band of metal about ¼-in. wide around the margins of a sheet of glass while this was still hot. Two of these sheets were then assembled face to face, separated by a copper strip approximately ¼ in. high, and the whole soldered into an air-tight, moisture-proof unit which would not fog up, regardless of the differences of temperature and humidity on opposite sides. Glasses for meters were similarly sprayed around the edges so that they could be soldered into place rather than locked by spinning over the edges of the frame. Other applications to glass have included the coating of reflectors for use on automobiles and bicycles, and the manufacture of reflector buttons used on road signs and markers.

Metal caskets are in growing demand, but even with the lifting of restrictions on such metals as silver and bronze, their cost is prohibitive to all but the very wealthy. One ingenious manufacturer, however, has solved the difficulty by manufacturing these of almost imperishable cypress, and then coating them with a substantial layer of bronze or other metal by metallizing. The resultant product will last a very long time and the cost is but a fraction of that of solid metal.

In the electrical industry, carbon brushes of all kinds, from the smallest flea-power motor size to those used in high-output motors and generators, are commonly coated with a strip of copper at one end by metallizing; and an entirely new process of manufacturing capacitators from strips of fabric, metal sprayed, has made it possible to reduce the size to one-tenth of those made with metal foil. This has been highly important in the construction of small radio sets where overall size must be kept to a minimum.

Speed nuts, used by the million in aircraft construction, and to be used in even greater numbers in the manufacture of civilian goods, from automobiles to refrigerators, were originally plated to prevent corrosion. Unfortunately, however, the plating process induced hydrogen embrittlement and consequent breakage. This difficulty was solved by metallizing the nuts in a rotating barrel. One man was able to thoroughly coat 1,009,000 nuts in 12 hr by this process.

All of these applications called for continuous operation of the guns, and it was for this reason that Metallizing Engineering Co., Inc., introduced an entirely new type of spray gun. Intended for use with a rigid support, weight limitations have been virtually disregarded, and the entire mechanism has been solidly built to withstand the strain of uninterrupted use. Pressure of the oxygen is employed to feed the gas by a syphoning action, and consequently a precise balance of

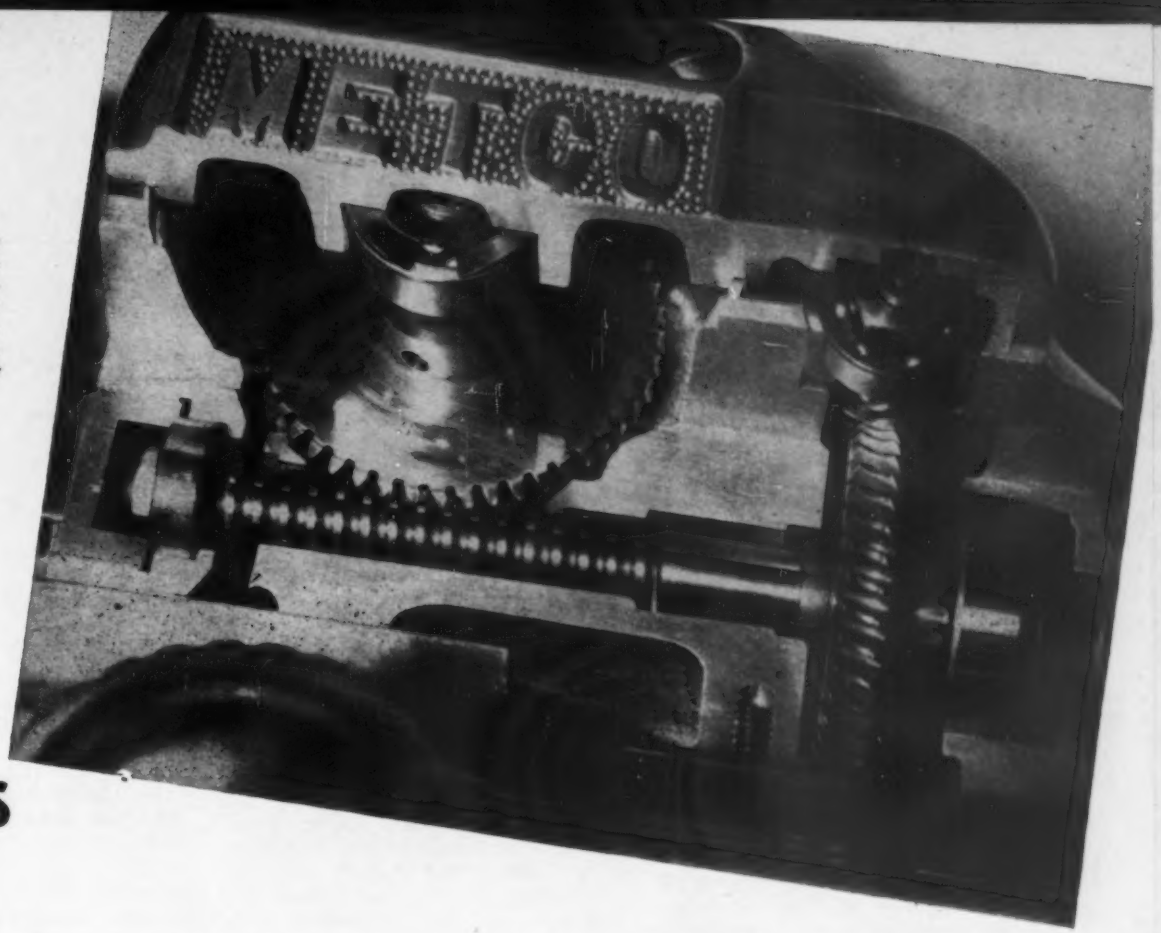



FIG. 2—The sturdy construction is evident in this approximately full-size view of the gear train. Note how the worm is extended to act as an oil pump.

# Process

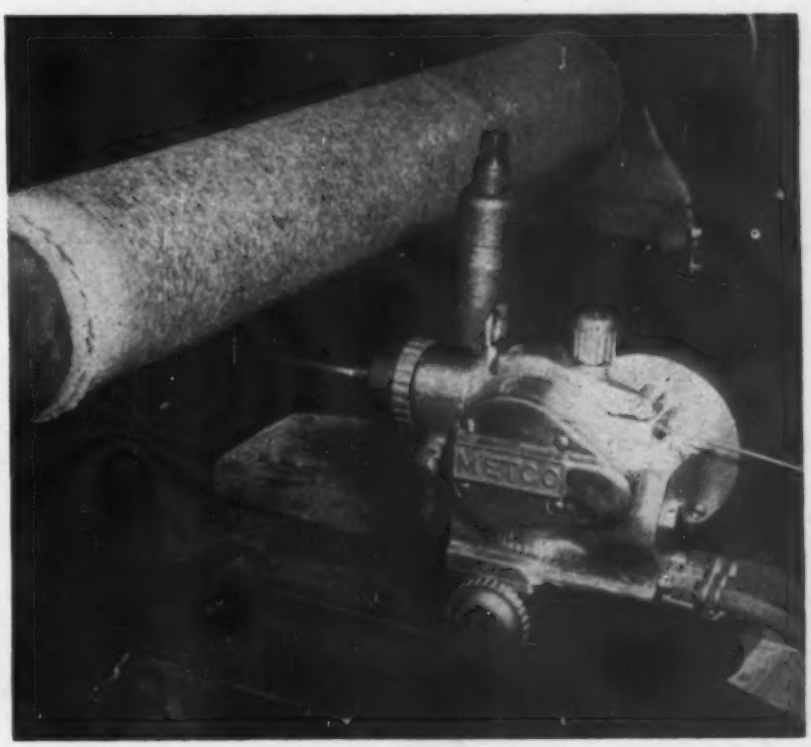
gases is no longer necessary. Variations of from 2 to 10 lb of either oxygen or acetylene pressures, either at the time of lighting or during operation, have little or no effect, and it is almost impossible to make the gun backfire. The gas syphon plug, which is also the nozzle seat, is a separate unit and may be removed for cleaning without any difficulty. Safety is increased by the fact that only 15 lb pressure of acetylene is required, in place of the conventional 25 lb.

A new type of power absorption governor has been embodied to maintain constant turbine speed at any desired setting, by means of a double braking mechanism, and slipping of the adjustment is eliminated by the use of a spring loaded indent. All hose connections are made at the rear of the gun, and positive fluid lubrication of all working parts has been assured by employing an extension of the worm as a pump to carry the oil from the oil reservoir formed by the main housing.

By permitting the use of 3/16-in. wire in place of the ⅛-in. formerly employed, spraying speeds have been virtually doubled and fuel consumption reduced. In spraying copper, for example, the consumption of oxygen amounts to only 2.9 cu ft per lb of metal, and acetylene 1.3 cu ft. This represents a reduction of approximately 20 pct over the standard type of hand gun. The spraying speed of copper has been increased from 17 lb per hr to 35 lb per hr, low carbon steel from 10 lb to 22 lb, stainless steel from 11 lb to 19 lb, aluminum from 7 lb to 16 lb, and zinc from 40 lb to 70 lb.

The fact that this new type of spray gun has been designed specifically for continuous, heavy-duty operation, does not, of course, interfere with its use for maintenance work, but proper support must be provided since its weight of 22 lb makes it too heavy for hand use.

FIG. 3—A hot oil pump plunger is repaired by spraying with a 3/16 in. coating of stainless steel, using a spray gun attached to a lathe tool post.



# Hypersonic Analyzer Betters Testing Technique

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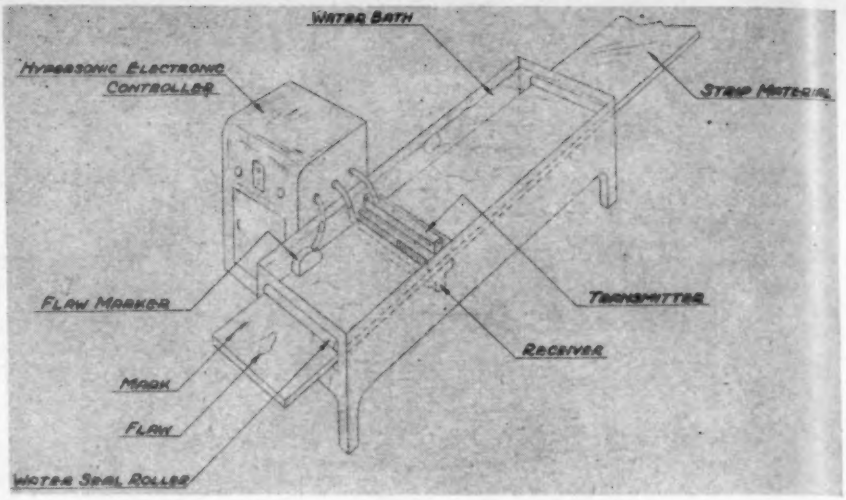
HIGH speed production can be efficient only if the rejection rate is low. Further, a section of raw material which is destined to cause rejection of a given assembly or fabrication should be caught as early as possible. Production testing of any material must, of necessity, be non-destructive and the inspection time must be small.

"Hypersonic" testing has now been added to the list of methods for examining flaws in materials. At The Brush Development Co., Cleveland, a method has been devised which, basically, is one whereby a sound generator sends a beam through a specimen. The specimen, depending on its properties, modifies the beam and the resulting energy pattern is picked up on the side opposite the generator by means of a microphone. It is possible to select a critical set of radiation frequencies and electro-acoustic designs so that the resultant beams through the material are highly modified by any given type of flaw in any given material.

*For other articles on Supersonics, see* THE IRON AGE *issues of May* 15, 1941 *and June* 8, *Aug.* 24, *Nov.* 9, 1944

The Hypersonic analyzer consists essentially of (1) A piezoelectric crystal transmitter, (2) a piezoelectric crystal receiver, and (3) a signalling or marking device. The crystal transmitter sends supersonic waves through the material being examined. These waves are picked up by the crystal receiver and a constant result is registered until flaws, defects or a definite change in density are encountered. The actual detection and identification of the flaw or defect may be indicated in any of several desired ways—on a meter, by signal light or a bell, or a relay hookup may be used to make whatever physical markings may be desired.

Generally speaking, the use of a liquid as the transmitting medium is desirable in Hypersonic inspection. The reason for this is that fluids such as water and oil give better coupling between the transmitter, the material under inspection and the receiver, at supersonic frequencies. However, in certain instances air or other gases make a satisfactory transmitting medium. The choice of medium depends upon the particular material being examined and also the physical possibility of exposure of the material to the medium.

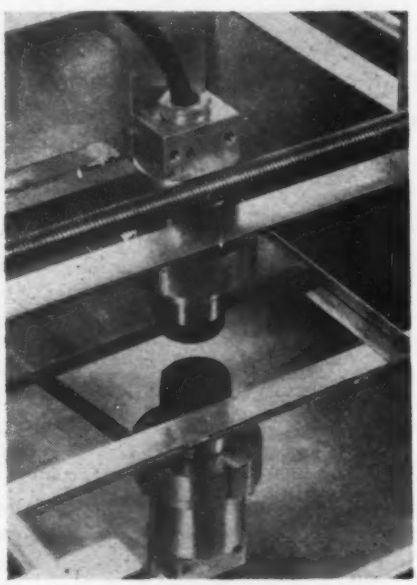



HYPERSONIC scanning setup for continuous strip mill inspection.

Since the Hypersonic analyzer can detect any change in density of a wide variety of materials, its possible uses are almost limitless. In the rolling of sheet steel, for example, the Brush Hypersonic analyzer will accurately detect and identify the location of "pipes," "cat's eyes," "blisters" and laminations. Moreover, it will detect and identify such defects early in the manufacturing process, thus making possible very appreciable savings in time and money expended on finishing. Experiments indicate that flaws as small as 0.001 in. in thickness can be detected by the analyzer, independent of the thickness of the specimen being spected.

The Hypersonic analyzer offers the same inspection possibilities for many other metals. Completely satisfactory tests have already been made on aluminum, phosphor bronze, beryllium copper, brass and other metals and alloys. It is also highly sensitive to flaws in plastics and other extruded materials.

CRYSTAL transmitter, steel plate being tested, and crystal receiver arrangement in a sample test tank.



The new method is useful for a wide variety of applications in many industries. For example, in 1944, the United States government embarked upon a heavy schedule of rocket projectile production. Uniformity in the composition of the rocket sticks and absence of voids, flaws, and foreign material, was imperative. The presence of any flaws in the powder sticks would result in a premature explosion, rather than a uniform propelling action.

At the start of the rocket projectile program Xray was used for inspection of the rocket powder sticks. This was so costly and time consuming, that the Hypersonic analyzer, developed by Brush, replaced Xray. It saved tremendous quantities of Xray film for other uses and saved the government large amounts in inspection costs. The inspection procedure involved passing supersonic waves of very high frequency generated by a crystal connected to a specially designed electronic circuit through a rocket powder grain from various angles. These grains are from 5 in. to 5 ft long. If the grain had a minute air space under the surface, a certain percentage of the supersonic sound waves were deflected from a known course. This deflection was recorded on a meter connected to a receiving crystal, so that a permanent record was obtained.

Another popular use of Hypersonics is in the inspection of tires. Sometimes the rubber jacket blisters away from the cotton fabric and a thin air packet lies in between. Xray will not reveal this defect, but the supersonic analyzer brings it out very clearly. Any separation, no matter how small, between two bonded surfaces—such as tire plies, safety glass, bonded metal strips, poor cement joints which occur in cycle welding—results in a change of density which can be easily and accurately detected by the analyzer.

# Electric Furnace Operators Meet

CONFERENCE Chairman Charles W. Briggs welcomed new members to the third annual Electric Furnace Steel Conference, sponsored by the Electric Furnace Steel Committee of the Iron and Steel Div., AIME, at Cleveland, last week.

He pointed to the permanence of the organization, based upon the fact that "we have successfully passed the organization period which was troubled by the experiences of being a wartime baby. The Conference has grown with a speed that is remarkable for a group of this type. The first Conference had 450 persons in attendance, the second had 569. Such attendance figures illustrate that there has been a definite need for a meeting of the manufacturers and others interested in the manufacture of electric furnace steel."

Chairman Briggs emphasized the need by stating that "before 1940, only 25 pct of the total alloy steel output was electric steel. Since then, there has been a steady expansion to 34 pct in 1944."

## *Sillimanite and Magnesite Sleeves and Nozzles*

IN a basic steel session on "Ladles and Pouring Practice," M. Corbman, Bethlehem Steel Co. refractory engineer, presented a paper discussing the problems of sleeves and nozzle refractories. He stated that in the pouring practice at Bethlehem, the most satisfactory results have been with the conventional clay type refractory sleeve and nozzle. At various times, experiments have been made with special composition sleeves and nozzles. These experiments have been successful for sleeves, but not for nozzles.

Sillimanite nozzles or other equivalent compositions of the high alumina super refractories group have been tried in the plant. One of the primary functions of a nozzle is to soften at the pouring temperature of the metal in order to form its own seat when pressure is applied to the stopper rod assembly. If the nozzle is too refractory, as would be the case with sillimanite, this function would be lost. As most high alumina refractories do not soften until about 3000° F, they are not practical for nozzles.

High alumina refractories are difficult to fire to a dense body so that the cutting action of the steel on the nozzle would be as great or greater than with a conventional type clay nozzle. The range of apparent porosity of high alumina refractories is from 18 to 23 pct, whereas the porosity of clay nozzles ranges from 11 to 15 pct. The denser the nozzle, the more mechanical strength the nozzle will have, and will result in a less permeable surface of the steel to the nozzle, resulting in less cutting and erosion. However, where the nozzle is too dense, less than 11 pct porosity, its resistance to thermal shock is decreased so that spalling and cracks in the nozzle result.

For all practical purposes, clay nozzles of not over PCE 23 (2876° F) porosity range 11 to 15 pct, are satisfactory.

The use of magnesite nozzles has been tried at Bethlehem without success. The magnesite nozzle is mechanically weak and has poor spalling resistance. In the experiment the nozzle was preheated to a high temperature before starting to pour ingots, but the nozzle spalled badly in spite of the preheat. The inclusions which result from the spalled nozzle are more detrimental than the cutting and erosion from the clay nozzle.

The problem of sleeve refractories presents different factors than nozzles. The sleeve acts as an insulator for the stopper rod and the refractories should withstand the action of molten slag and metal for the duration of the pour. The sleeves should be more refractory than the nozzle. The sleeve refractory should not soften, but should remain rigid and dense so that cutting and erosion will be at a minimum. The sleeve refractory should be at least PCE 26, (2900° F), as dense as possible without spalling. Sleeves of apparent porosity between 11 and 15 pct have given better results than sleeves greater than 15 pct porosity. Below 11 pct porosity, they spall due to their high density.

Sleeves made from sillimanite or other high alumina super refractories should give good results where steel is being poured at either elevated temperatures or where the slags are exceedingly corrosive. These conditions are prevalent in electric furnace practice. The additional refractoriness of the high alumina super refractories will prevent the sleeves from burning through and severing the stopper rod. This retarding of the rate of erosion of the sleeve by the slag may be more costly, but this cost is offset by a better pouring practice.

In the basic electric furnace, the lime-silica slags are very corrosive, and where the practice is to hold heats in the ladle up to 20 min or more, the conventional clay sleeves frequently burn or corrode through before starting to pour ingots.

A successful practice has resulted by using a sleeve, which is made by mixing the clay with a certain percent of carbon and burning in a reducing atmosphere. When these sleeves are used, only about half as much erosion takes place as the standard sleeve. The carbon present in the sleeve retards the rate of erosion so that the stopper rod is protected.

On the 7 ton basic electric furnace, we make the special alloys and steels requiring high temperatures. The practice has been improved by using a clay graphite, sodium silicate mixture in all the joints of the rod assembly, and has reduced erosion of joints.

In summarizing, more refractory nozzles will not reduce cutting and

will not soften sufficiently to form a seat from the pressure of the rod assembly. Magnesite nozzles are too weak and spall readily, making pouring difficult with excessive inclusions.

More refractory sleeves of the high alumina super refractories group are better than the conventional clay sleeves where corrosive slags and higher temperatures are prevalent.

Sleeves containing a small percent of carbon give less erosion than the conventional clay sleeves.

Rod assemblies using a clay graphite, sodium silicate mixture for the sleeve and stopper head joints have reduced all erosion of joints during pouring.

# Production Technique for Stainless Steels

At the Wednesday afternoon stainless steel session, E. J. Chelius of the Carnegie-Illinois Steel Co., outlined the production methods in operation at the Duquesne plant.

In regard to furnace charging, he said, "our procedure for charging scrap in the production of stainless steels is followed closely. We place ½ to 2/3 of the light stainless (sheet and turnings) directly on the bottom with heavy, low carbon ordinary piled high in the delta section. Heating furnace cinder, ore, or scale is then charged out of the delta. Around the low carbon ordinary in the delta, we charge about ½ of the heavy stainless slabs and butts which lies low on the banks. On top of this is placed nickel or a combination of nickel and nickel oxide to the right and left of the charging door, toward the banks. We cover the nickel or nickel and nickel oxide with the balance of light stainless, which also shields the arc. The charge is completed by charging the balance of the heavy stainless to the right and left of the charging door on top of the light stainless, making back charging unnecessary.

## Heating to Remove Moisture

We have a gas-fired heating furnace on the charging floor, with a capacity of 12 to 28 cu ft charging boxes. It is serviced by the charging machine, through four doors, opened and closed by pneumatic devices.

Materials such as coke, spar, scale, cinder, ore, ferroalloys, etc., are heated (prior to use) in the furnace to remove moisture. In inclement weather, scrap used in critical grades of steel also passes through this unit.

Alloys and other raw materials should not be overheated (to minimize oxidation), so we attempt to hold the temperature around 500° F. However, we have heated scrap up to 1600° F.

## Melting and Refining

When melting stainless steel in a 35-ton furnace, we start on an intermediate tap, 190 v with a low amperage setting. This setting is not changed until a constant arc can be maintained. At that time the amperage setting is increased (same voltage tap) until the electrodes have bored through the scrap and then retarded approximately 6 to 8 in. above the bottom. We then use maximum power input on the 250 v tap.

50 lb per ton of burnt lime is added at 1/3 melt and when 2/3 melted, oxygen is fed into the bath at the rate of 65 cfm at approximately 85 lb of pressure, until the melt carbon test is reported.

After the scrap is melted we cut back to the 145 v tap and rabble the heat with a mixing paddle mounted on the charging machine. A test is then taken for C and Mn. If the carbon is low enough the heat is "bombed" with lumps of 50 pct ferrosilicon and a test is taken for C, Mn, Ni, and Cr. We then slag off.

A new slag is made up consisting of 25 lb per ton of burnt lime, 5 lb per ton of hot spar and 3 lb per ton of 75 pct ferrosilicon fines, mixed, and spread over the bath.

An intermediate tap, 190 v high amperage, is then used until the slag goes into solution. After rabbling the bath, test is taken for C, Mn, Cr, Ni, and Si. Hot ferrochrome in 5000 lb "doses" is added at 15 to 20 min intervals while the tests are being analyzed. Adjustment on each element is made to meet the specified analysis as soon as the element is determined in the chemical laboratory.

Temperature tests are taken at various intervals from time of melt to tap by pouring spoon tests and by optical pyrometer readings on spoon tests.

Our average charge of scrap on stainless is:

Type 302—85 pct stainless and 15 pct low carbon ordinary

Type 304—70 pct stainless and 30 pct low carbon ordinary

We average about 45.6 tons per heat in 9 ft 35 in (tap to tap). Our longest stainless run was 60 heats with a product mix covering the following ranges:

Carbon—under .06, .07, .08, and .12 pct.

Chromium—17.50 to 25.00 pct.

Nickel—9.00 to 15.00 pct.

Our off-grade performance for the 60 consecutive heats was less than 5 pct with one element out of range (only one point) being considered as an off-grade heat.

## Use of the Oxygen Lance

At Duquesne our supply of oxygen is plentiful since there is a dri-ox station in the plant. The equipment used in our melt shop consists of an outlet on the dri-ox line, a dri-ox hose, a special lance, and ½ in. ID pipes. We cover the pipes with 1 in. of ganister or patching and wrap them with cotton tape or rags to hold the refractory in place. Several pipes are made up at one time and dried thoroughly before being used.

When the heat is approximately 2/3 melted a dried pipe is connected to the special lance and pushed through the wicket hole in either the side door or the charging door. The end of the pipe is inserted under the slag and the dri-ox is turned on full. We average about 85 lb of pressure at the mouth of the pipe. Keeping the end of the pipes just under the slag, the lance is fed slowly (it burns at the rate of approximately 6 ipm) until it gets too short to use. We consume about 3 lances per heat with each lance lasting about 20 min.

During the dri-ox blow the temperature must be closely observed and the power taken off if necessary.

A test is taken for C and Mn after the heat is melted. If the carbon is low enough the heat is "bombed" with Si and slagged off as quickly as possible (under 15 min preferred).

## Mold Preparation

Close control over all phases of steel production is essential; therefore, the conditioning of molds is of prime importance. At Duquesne a definite procedure for mold preparation has been established and is being followed at all times. This procedure is as follows:

1. Remove all debris (including plugs) from the molds.

2. Turn foreman and first mold preparingman inspect molds for any defects which might result in poor

mold practice, and scrap all defective molds.

3. Scrape mold interior with a wire brush to clean thoroughly, then blow out dirt with compressed air.

4. Inspect as in step No. 2.

5. Check mold temperature—"hand warm" is most desirable.

6. If mold is not too hot, apply aluminum paint with a long-handle brush.

7. Tamp about 1 in of sillimanite into the plug hole and dry for about 15 min.

8. Set heated plug in hole and tap lightly into place.

9. Siphon mold and cover it.

10. Remove hot tops from drying oven (where they were heated upside down to insure a dry portion of hot top at the junction) and set at proper blocking height, approximately 30 in. before tapping the heat.

11. Siphon molds carefully and cover molds again until pouring time.

New molds are heated to about 300° F and scraped down before the above procedure is followed. This preliminary heating expedites the removal of the oxidized surface that is common to molds in storage for periods of time.

### Pouring Practice and Bottom Pour

Both bottom and top casting are used on stainless grades. We cast ingots ranging from 12 in. x 12 in. weighing 1950 lb to 28 in. x 61 in. slabs weighing 40,000 lb each. Our nozzle sizes vary from 1 in. to 3 in. depending on grades and ingot sizes."

# Top vs. Machine Charging Basic Arc Electric Furnaces

A JOINT session on "Ideal Conditions for Fast Melting," covered all phases of the subject. From the standpoint of methods of charging and recharging, Henry Bigge of the Bethlehem Steel Co. presented the following paper.

The merits of relative performance of top charging versus side door charging in the larger types remains a moot subject. However, most of the recent installations of 50-tons capacity or more have been of the door-charging type. The chief problem is one of fitting the unit to the plant layout.

The top charging method consists of two designs, namely:

**(1) Gantry Roof Lift Type**
**(2) Roof Swing Type**

### Gantry Roof Lift Type

In this design the electrode masts and the roof raising equipment are built into a gantry crane which travels on rails along the charging floor. When the furnace is to be charged, the electrodes are raised to clear the shell and the roof is lifted. The gantry is then moved aside, carrying the roof and the electrodes; all movements are motor operated. When the gantry is not being used to remove the roof it is locked to the furnace and tilted with it.

### Roof Swing Type

The roof and the supporting structure for the electrode masts are lifted and swung to one side by a vertically operated oil-hydraulic ram and cylinder. Incorporated in this cylinder is a horizontal double-acting cylinder having a quadrant member so designed that the vertical ram may be turned in either direction (to swing the roof) only when the ram is in the maximum lifting position. A three way piston type valve operates the vertical cylinder to lift the roof. Roof swing is controlled by a decelerating valve which controls the speed of the swing to maximum positions, open or closed. This valve decelerates to the point of complete shutoff, thus preventing shocks at the end of swings. The oil pressure for the operation is usually supplied from an oil-hydraulic power unit. There are two types, the one is a separate ram mounted on the floor, whereas the other is fastened to the side of the furnace.

The side door method consists of:

**(1) Chute Charging**
**(2) Auto-Floor Charging**
**(3) Machine Charging**

### Chute Charging

This method has been widely employed for light miscellaneous scrap, such as is utilized in foundries. The chute is designed to take part of the charge of average-sized scrap. To facilitate the sliding of the scrap, the chute is fitted with pneumatic or electric agitators. The furnace is tilted about 15° and the chute is suspended from the overhead crane, and inserted through the charging door opening. At present it is in use on a 15 ft shell-diam furnace of 40 net tons capacity.

### Auto-Floor Charging Machine

This machine is self contained and requires no track or runways. It is electrically operated; the power for the two motors is transmitted through a flexible cable attached to a rotating collector which is mounted at the top of a mast. The movement of the machine is not restricted to any definite path and it may thus operate freely at any point around the melting floor, limited only by the length of the cable. A good floor is needed for the successful operation of this machine. It can be used in congested areas because it turns on its own wheel base. This machine is equipped for handling small charging boxes similar to the method employed in the machine charging used in the openhearth departments.

### Machine Charging

This is an electrically operated manipulator mounted on rails on the melting platform similar to the machines used for charging scrap into openhearth furnaces. It is equipped with a charging peel for handling small boxes of scrap; the size and capacity of the boxes depend on the opening in the charging door.

### Charging Methods

**Bucket Method** — Top charge furnaces can be charged with an electric magnet or by means of a drop bottom bucket, both handled by an overhead crane. Large pieces of scrap can be placed on the furnace bottom thereby saving expense of preparing the scrap. In most cases the scrap charge is placed in a drop bottom charging bucket of a diameter slightly smaller than the inside diameter of the furnace lining and of a volume equivalent to that of the inside diameter of the brickwork and hearth area. The bottom of the bucket consists of a number of hinged segments held together in the center by some mechanical device or fastened together with a three-quarter or one-inch diam rope. Care must be exercised when using the bucket to prevent the scrap from dropping onto the hearth and prevent the segments from striking the furnace lining. This can be prevented by using the rope method and placing the bucket on the hot bottom until the rope burns (requiring about 2 min.) and then extracting the bucket allowing the scrap to fall onto the hearth without any serious damage to the bottom or side wall.

In the bucket method, numerous buckets are filled in the scrap-yard by hand or electric magnet and the

scrap is placed in the desired location in the bucket placing the heavy pieces on the bottom, followed with medium and then light flashings, turnings, etc. The stratified scrap will be placed in about a similar position when it is charged into the furnace.

This results in a considerable saving of time and the method is desirable for speeding up furnace operations. There are some installations in use on 18 ft diam 70 ton capacity showing excellent results in saving time and expense. Total time from tap to tap is 20 min including bottom repairs and charging furnace.

**Machine Charging Method** — The time required for machine charging cold scrap is an appreciable item. More time is required in loading charging boxes, extra time in handling and weighing and more time in charging and recharging the furnace than with the top charge method. The average number of charging boxes for an 80,000 lb scrap charge (15 ft Diam Shell) 39 Ton Capacity Furnace is 30, containing about 2660 lb per box and requires from 20 to 30 min to charge (depending upon the size of the scrap) and about 20 min to repair the bottom, banks and tap hole, or a total of 45 min from tap to tap.

With a charging machine the total time may be considerably more than the top charging furnace. However, the method enables charging heavy and light scrap with the least amount of wear and tear on the furnace lining provided care is exercised by the charging machine operator. It also permits back-charging with a minimum loss of time and is used to advantage for the addition of fluxes, iron ore and mill scale on the melt-down and also in the addition of the fluxes and ferro-alloys during the refining period. It can also be used to advantage in rabbling or stirring the metal before tapping.

On the machine-charged furnace the roof will not be subjected to as great a variation in temperature as that of a top-charged furnace. The roof of the latter is taken off and subjected to extreme temperature changes and if the roofs are of silica brick construction, the rapid changes in temperature may cause them to crack and spall if under 1200° F.

It is necessary to have the scrap charge ready before removing the roof. If an additional charge is required, the roof is replaced immediately after the first charge has been made and is then removed again as soon as the second charge is ready and again immediately replaced.

### Roofs

For constructing basic furnace roofs, silica brick is most commonly used, as it has the unquestioned advantage of being cheap and readily available. It also has excellent strength up to its fusion point. The principal difficulty with silica brick is its relatively low fusibility. Average silica brick, with the normal amount of impurities, melts at about 3050° F. Thus the operating temperature of the roof comes very close to the melting point of the refractory itself. For this reason it is important that none but the best grades of silica brick be used in the roof. The brick should be accurate to dimensions, fully burned, dense and well bonded.

Silica brick has a marked tendency to spall under low operating conditions (temperature fluctuations). The cristobalite phase, which constitutes a preponderant part of the brick, has an unusually high thermal expansion at low temperatures, and low temperature spalling is therefore serious. Silica brick does not spall at higher temperatures as it has low expansion at the higher temperatures.

Super-duty fireclay brick, containing from 40 to 50 pct alumina, is sometimes used for roof construction on intermittent furnaces. This brick resists spalling excellently. This increased refractoriness is helpful, but on account of excessive shrinkage above 2800° F it is not suitable for basic arc-furnace operations when temperatures run above 3100° F.

Brick with 50 to 60 pct alumina is more stable if hard fired than the types containing 40 to 50 pct.

# Vanadium in Cast Iron

ALTHOUGH vanadium as an alloying element in steel making has been useful, vanadium in cast iron, however, has not received so much attention. Vanadium additions improve the mechanical properties of cast iron to a degree not exceeding a 25 pct increase in strength, depending upon the amount added and the composition of the base metal. According to a paper by J. W. Grant published in the September Bulletin of the British Cast Iron Research Assn., there has been somewhat scanty information relating to the effect of vanadium on the structural and physical properties of cast irons, and the uses to which vanadium cast irons have been applied. The availability of certain types of scrap steel in Britain containing vanadium gives this subject topical interest.

The improvement as a result of vanadium additions may be due to three causes—its action as a scavenger, its influence on the carbides and the effect of it entering into solid solution with the carbonless constituent. Vanadium additions of up to 0.3 pct appear to promote stronger pearlites, but the question of its behavior as a scavenger is controversial. The modern view is that vanadium does not perform a noticeable cleansing action. Vanadium behaves as a carbide stabilizer, and in this respect is generally considered to be more potent than chromium.

The hardness of a cast iron is increased by about 15 to 20 Brinell points for each 0.1 pct of vanadium. By its presence the carbides appear to be more stable and are slower to enter solution with the austenite.

Small additions of vanadium produce a deeper and harder chill. It is claimed from several sources that additions improve the wear-resisting properties of a cast iron, but as yet there is little to substantiate this claim. Additions of vanadium up to about 0.3 pct are generally sufficient to exert improved properties in general-purpose engineering gray iron castings. Additions may be made as finely powdered ferrovanadium at the cupola spout, in which case vanadium losses are about 20 to 25 pct. Pig irons containing vanadium and titanium may be charged direct to the cupola. Shrinkage and contractions are only very slightly affected by vanadium additions.

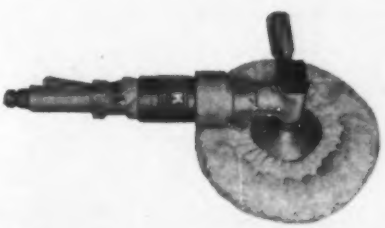
The effect of vanadium does not appear to be altered by the presence of other carbide stabilizing or hardening elements, e. g., chromium, molybdenum or tungsten, which exert with their own action independently.

# New Equipment . . .

## Finishing

***. . . In this week's issue are described interesting developments in finishing, including roller coating, small cleaning machine, spray gun, handy container, rinsing & drying machine, water proof varnish, buffing tool and alloy finish for wire.***

IT is revealed that the glass-smooth piano finish that minimizes surface resistance on jet propelled aircraft is accomplished by means of special surfacing tools, among them the Keller 20 PA Buffing Tool, announced by the *Keller Tool Co.*, Grand Haven, Mich. This pneumatic tool has a plastic handle to facilitate nonfatiguing operation, is notably light weight, high powered, and is of right angle design. It may easily be adapted for use in automotive plants for finishing fenders and bodies on new postwar automobiles. This tool is



now used in buffing operations on the Shooting Star, whose aerodynamic sleekness is said to be a matter of continuous comment.

### Alloy Finish for Wire

AN alloy finish for wire has been announced by *Johnson Steel & Wire Co., Inc.*, Worcester. It is claimed to give two to three times the rust resistance of tin with a finish that acts as a lubricant. This coating does not affect the physical properties of the wire, and, being zinc, solders better than tin. Unlike zinc coating, this finish is a special alloy with a smooth finish which is said to be highly resistant to corrosion from acids or gas fumes, and to act as a lubricant to reduce tool wear.

### Water Proof Varnish

DC 996 Silicone Varnish, a new heat stable, water-proof varnish for impregnating electrical equipment, has been announced by *Dow Corning Corp.*, Midland, Mich. Because of its low curing temperature, (300° F) it is claimed that this silicone varnish enables all types of electrical shops to realize the advantages of Silicone insulation. Among advantages are: greater protection against failure due to sustained overloads, greatly increased service life of electrical insulation, higher permissible operating and ambient temperatures, increased protection against excessive mosture even after prolonged exposure to elevated temperatures, the elmination of fire hazards resulting from the failure of conventional electrical insulation, and increased power output per unit weight. Another advantage of this varnish is that electrical equipment can be baked fully assembled without damaging the commutators or the slip rings. The temperature required to cure DC 996 does not affect shellac-bonded mica or core plating. Electrical equipment wound with silicone insulating materials and sealed by impregnating with DC 996 is said to have a high order of thermal stabilty and retenton of waterproofness.

### Cold Tank Cleaner

FUZEE, a cold tank cleaner, has been announced by *Turco Products, Inc.*, 6135 S. Central Ave., Los Angeles 1, and is now available for civilian use. Particular interest to smaller users is the new dip-tank container, in which the material is optionally obtainable. A metal dip rack has been developed to fit the standard five gal container, providing a simple means for cleaning small parts by immersion. Fuzee is a self-sealing compound for use in cold tank immersion cleaning of pistons, fuel pumps and carburetors, from which, according to its manufacturer, it quickly and thoroughly removes stubborn carbon, engine varnish and other adhesive dirt. Solvent fumes have been overcome in this cleaner


by use of a compound, on the surface of which a seal floats. This seal is said to practically eliminate fumes. The solvents have also been improved themselves, by increasing their wetting action, emulsifying value and penetrative powers, and finally rendering them practically impervious to corrosive contamination.

### Roller Coating

A METHOD of roller coating, by means of which many metal, wood and plastic products can be finished before stamping, forming or other fabricating, has been announced

by the *Japan Co.*, 5103 Lakeside Ave., Cleveland. Combining a specially designed coating machine with carefully engineered infra-red baking equipment, this new method is claimed to produce roller coated sheets completely baked in 3 min or less, as compared with 15 to 20 min periods commonly regarded as normal for the process. Various types of finishes are employed, including paint, enamel, lacquer, varnish and plastic coatings. The process was developed especially for the use of vinyl base materials, which produce extremely tough coatings. These plastic finishes are claimed to stand up even under deep drawing of metal parts. All types of coating are applied with great uniformity of thickness, tolerances as close as 0.001 in. being held to customers' specifications, and uniform color shades, including the most delicate pastels, are maintained without difficulty.

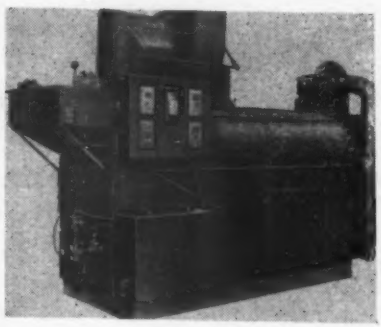
### Spray Gun

A light-weight spray gun with several improvements over prewar models has been announced by the *Binks Manufacturing Co.*, 3114 Carroll Ave., Chicago. This gun, known as the Model 19, is said to have many advantages. It weighs 1 lb 7 oz, and is claimed to be extremely easy to operate. The grip is designed to fit comfortably into the hand, thus reducing fatigue to a minimum. The gun has few parts, which makes it easy to take apart and reassemble for cleaning or repair, and is heavily nickel-plated. Special features of the

Model 19 include a nozzle of the self-centering type, designed on the tapered seat principle. Air cannot leak back through the retainer ring, and the air valve is cartridge type. Hose connections are standard, and needle valve is easily adjustable. A large air passage through the gun results in better utilization of the air. All controls are conveniently located at the back, and spray pattern is quickly adjustable from round to flat with all widths in between.

### Rinsing & Drying Machine

THE Optimus Screw-Drum Type Machine, especially designed for the rinsing and drying of screw machine or small stamped parts, has been announced by *Optimus Equipment Co.*, 137 Church St., Matawan, N. J. This machine can be used for



washing and drying, or rinsing and drying, and any other part of these operations. It is also adaptable to wash-drain, rinse-drain, cold or hot air dry operation sequence. It is claimed this machine is ideal for difficult rinsing and drying jobs, and can also be adapted for pickling operations. The air steam passes through heater and blower providing for either or both cold and hot air blast system. Air loss is avoided by completely enclosed dryer end. Various parts of the machine are readily accessible for lubrication, maintenance, or alterations and cleaning, such as might be required in hard water areas.

### Small Cleaning Machine

ESPECIALLY suited for metal working shops whose volume of parts to be cleaned does not warrant the installation of expensive, fully automatic cleaning equipment, a small machine for cleaning metal parts in production has been announced by *Equipment Div., Magnus Chemical Co., Inc.*, Garwood, N. J. This machine, a Magnus Aja-Dip, Jr., is used in metal working plants for the complete removal of cutting oil and chips, buffing compounds, smut, abrasives or any other operations. Parts are handled in batches of 30 to 75 lb, depending upon the model of the machine. One full batch of parts can be handled every 2 or 3 min. The parts to be cleaned are vigorously agitated up and down, 72 times a min, in the cleaning solution. It can be used with any type cleaning compound, alkaline, petroleum spirits, emulsifying agents and chlorinated solvents, and can also be used with hot or cold solutions. If heated, heating may be by either electricity or gas.

### Pre-Cleaner & Deoxidizers

OPTIMUS Aluminum Pre-Cleaner and Deoxidizers, have been announced by *Optimus Detergents Co.*, 140 Church St., Matawan, N. J. Their use permits the producing of low surface resistance on aluminum preparatory to spot welding. Among the advantages claimed are: a smut-free surface, oxide removed using a cold solution, negligible weight loss, minimum machine adjustment and minimum handling. Shop dirt, cutting oil, grease and identification paint are easily and completely removed in the prescribed pre-cleaning operation. In addition, the aluminum is placed in condition for Alrok treatment, anodizing and painting. With the use of the proper method all classes of alloys are easily handled.

### Handy Container

A handy container for a wide range of shop uses has been announced by the *Kindt-Collins Co.*, 12651 Elmwood Ave., Cleveland 11. They are sturdy, handsome containers of heavy aluminum, built to stand plenty of abuse in daily shop service. A feature of the can is the crossbar support inside the can, which can be readily removed for cleaning. This serves both as a wiping bar for surplus material on the brush, and as

a unit upon which to hang the brush when it is not in use. The cone-shaped top fits snugly over the can, covering both the brush and the contents, preventing hardening and evaporation. The aluminum will not stain or discolor the contents of the can. This container is available in one and two qt sizes for varying needs requiring glues, coatings, etc.

# 15 minutes...

## AS COMPARED WITH ½ a day!

Photo courtesy of United Precision Products Company, Chicago, Illinois

**P**recision gages and pins are checked for "utmost accuracy" on a Jones & Lamson Pedestal Optical Comparator and Measuring Machine in less than one tenth of the time it formerly took to inspect them without a Comparator. They are inspected for Length, Depth, Outline, Angles, Straightness and Grooves. This Optical Comparator is also used for inspecting Form Tools, Threads and other Profiles.


Perhaps a Jones & Lamson Optical Comparator could effect comparable savings for you. Write for our book, "Beyond a Shadow of a Doubt." Or, better still, ask for one of our inspection engineers to call and discuss your inspection problems.

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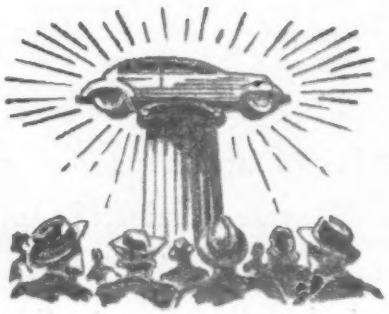
# Assembly Line . . .

STANLEY H. BRAMS

**• UAW on the retreat for first time since 1937 . . . Ford's aggressive attitude puts union on the defensive . . . End of strike seen closer.**



DETROIT—The United Automobile Workers Union of the CIO is on the retreat for the first time since it became a potent force in 1937. The time has passed when it can achieve a clearcut victory in the General Motors strike, it stands temporarily without a contract at Chrysler Corp., and Ford's aggressive attitude has put it on the defensive in that sector.

Negotiations leading to a settlement of the General Motors strike are in progress, and of course that brings the ultimate ending of the strike somewhat closer. But let there be no mistaking of the fact that the road back is a long and weary one, and the optimistic stories which appeared in Detroit newspapers late last week were born of wishful thinking rather than down-to-earth fact. Merely starting negotiations toward settlement means nothing as long as the parties are as far apart as they were when those discussions started. General Motors still insists that it will not discuss retail product prices and corporate profits in any bargaining negotiation with the union, and this stand is very positive. The union commenced last week a slow withdrawal from its insistence that wages, prices, and profits be considered together, but time is required before a position can be abandoned without too much loss of face, and therein lies the probability that many days will elapse before a new arrangement on wages is negotiated.

General Motors increased its offer fractionally by proposing a 13.5¢ per hr raise for all its employees, the same as was made somewhat earlier to the workers in five plants represented by the United Electrical Workers Union of the CIO. This actually reflected somewhere around an 11.5 pct increase over the present pay rates, and was based on the original Collet statement that the cost of living has gone up 30 pct since before the war. Since making that statement, however, Collet has revised the figure to 33 pct. Accordingly, it would be in no wise surprising to see General Motors increase its 13.5¢ offer to somewhere around 16¢ as the bargaining progresses.

With signs of weakening so apparent in the union camp, a settlement somewhere very slightly higher than this probable 16¢ offer seems inevitable. A good range for prediction would be 16¢ to 20¢, representing approximately 14 pct to 17 pct.

ON the union side of the fence, matters seem to be dependent a great deal on the internal political structure of the union. This was clearly demonstrated in the now celebrated "parts letter" written over the signature of union president R. J. Thomas in answer to a communication from General Motors president C. E. Wilson.

Mr. Wilson proposed that G.M. parts plants required to keep other automobile companies in operation be put back into production. In addition to the obvious desire to maintain customers and to avoid charges that it was pulling the entire industry into shutdown with it, General Motors probably foresaw that this proposition would create difficulty for the union. It did—with a bang.

The Thomas answer accepted the proposal with what might be described as modest enthusiasm and approbation. But hardly had the letter appeared when rank-and-file complaints reached a querulous pitch, the attitude being that no plants would go back to work until all did. Mr. Thomas rushed back from Washington, denied authorship of the letter (written by his secretary and publicity chief, David Connery) and apparently called off the whole deal. By way of redeeming himself in the eyes of members who thought he might have been injuring them, he promptly dispatched a telegram to Attorney General Tom Clark in Washington, pointing out that the Wilson letter was *ipso facto* proof that G.M. was a monopoly, and should be investigated under the Sherman Act.

One clause in the letter deserves noteworthy attention. It is to the effect that the sole purpose of the auto workers in striking is "to maintain on a decent American level the standard of living of the 325,000 General Motors workers." There is no mention here of the wage-price principle or the wage-profits correlation. Whether Thomas wanted to put across to General Motors the fact that he was not entirely in sympathy with Walter Reuther's ideas on that subject is something which probably will never be known, but the effect of it was not lost on G.M.

Its officials promptly accepted an invitation tendered through the electrical workers to a conference in Phillip Murray's office in Pittsburgh last week. There, they reiterated their determination not to bargain over prices or profits, and in this appeared to have the support of Mr. Murray and Mr. Thomas. After the meeting, however, Mr. Reuther told reporters that "G.M. has agreed to go into the negotiations with no strings attached." This nearly kicked over the arrangement which Murray had set up, and the negotiations which followed were stormy indeed, with Mr. Reuther and Harry W. Anderson, General Motors personnel chief, talking definitely harshly to each other while Thomas strove unsuccessfully to be mediator.

THIS was followed by the weekend session of a specially called council of G.M. locals. The council did as expected and rejected the President's plea to return to work, and also turned thumbs down on the corporation's latest offer, which amounts to $1.08 a day. The members of the council then went back to their re-

**ON WORK BETWEEN 10" AND 20" IN DIAMETER**

# No other Special-Purpose Machine produces so much for so little

If you are interested in a time-tested method for getting maximum production at lowest unit costs without sacrificing accuracy, you will want to investigate the Bullard Contin-U-Matic Lathe.

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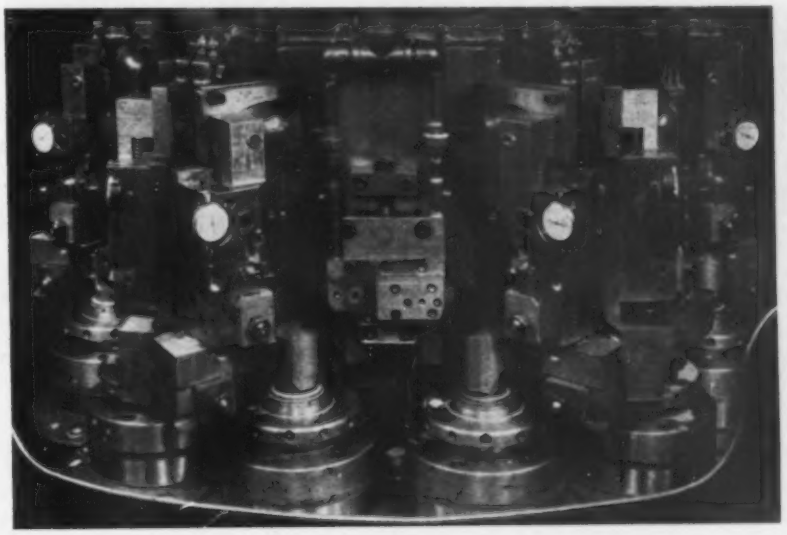
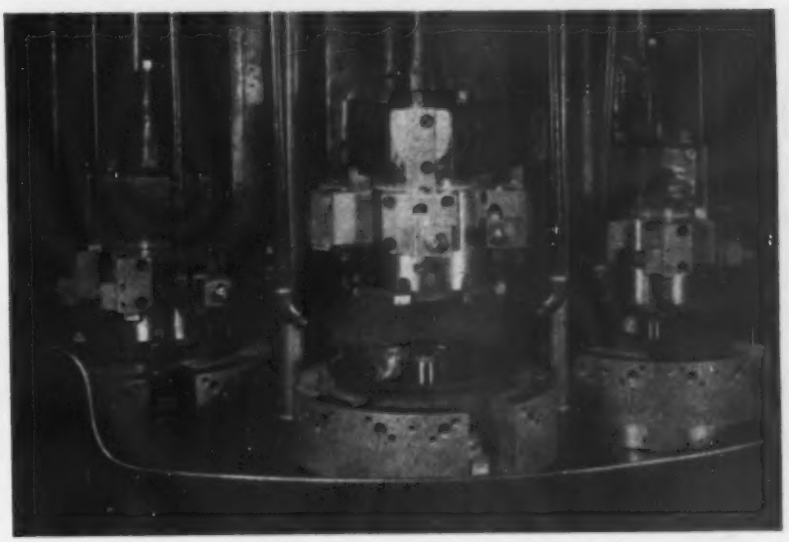
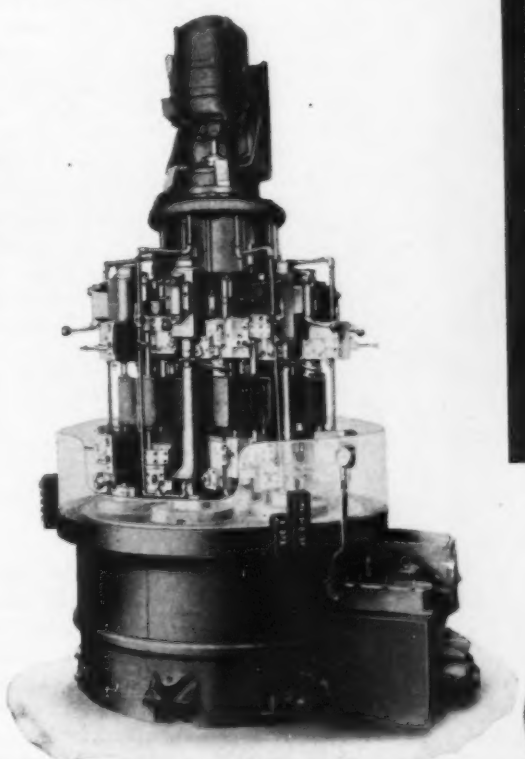
The Bullard Contin-U-Matic Lathe is made in 14" and 20" sizes with six spindles and in the 10" size with either six or twelve spindles. Write today for complete information. The Bullard Co., Bridgeport 2, Connecticut.



Close-up of job being produced on 12-spindle Contin-U-Matic



Close-up of job being produced on 6-spindle Contin-U-Matic



Typical Bullard Contin-U-Matic Lathe

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**CREATES *NEW METHODS* FOR MAKING MACHINES DO MORE**

spective locals to seek votes of the rank-and-file to confirm their actions —something which will be coming along in due course.

Meanwhile, Chrysler's workers, all 55,000 hourly paid of them, are working without a contract today. Whatever ideas the union local might have had about reaching an agreement with Chrysler had been nullified by its inability to make any kind of a deal until the G.M. pattern is more defined. Accordingly, negotiations have straggled along slowly and fruitlessly, with the union's 30 pct demand answered by the company's offer to increase wages to a proportion of cost of living advance since 1941. In the Chrysler case, this was estimated to amount to about 10¢ per man per hr. The union turned this down during the closing hours of the contract's life, and then proposed that it be extended a second time until Jan. 15. The corporation refused, proffering the alternative of continuing it without change for a full year. When this was refused the agreement lapsed and now the union, unable to back up its dissatisfaction with a strike, in line with basic strategy (of concentrating on G.M. for the time being) is trying without any great success to achieve some gains in continuing negotiations.

•

## Kelsey-Hayes Parts Shipments Resumed

*Detroit*

• • • **Kelsey-Hayes Wheel Co.** has resumed shipments of wheels and brake parts for trucks to **Ford Motor Co.** and other customers after approximately a two-week period of refusal to make such shipments because of OPA pricing policy.

When the company stopped its shipments in November it advised its customers that it was not able to absorb increased prices of material and labor in effect since 1942, and had received no OPA release on its price ceilings. The resumption of shipments came after OPA officials assured the concern that price ceilings on original truck parts will be lifted very shortly, as they already have been on passenger car parts.

The resumed shipments make it possible for Ford to go back to full truck production after having slashed it 65 pct from projected levels due to the cutoff in its parts requirements.

•

## G.M. Drops Regina Plant

*Regina, Canada*

• • • **General Motors Corp.** of Canada will abandon production of motor cars in western Canada and it is announced that the Ottawa Government is buying the corporation's Regina assembly plant for $700,000. The National Defense Dept. plans to take over the building early in the New Year and it will be used for an ordnance depot, employing between 300 and 600 persons. In recent years the plant has been used by Regina Industries Ltd., on war contracts.

General Motors erected the plant in 1928 at a cost of $1,500,000 and for three years used it for car assembly for the west, and then it was idle for six years owing to the depression, but reopened again in 1937 and employed some 500 persons on a seasonal basis turning out as many as 10,000 cars a year. It was converted into a munitions plant in 1941 and operated under Regina Industries Ltd. The plant covers some 40 acres.

•

## Start Ford Office Annex

*Detroit*

• • • **Ford Motor Co.** will begin immediately an annex to the present administration building at 3000 Schaefer Road, attached to the main office structure by a 76-ft overhead passage. It will house approximately 1000 office employees in floor space of about 66,000 sq ft.

The present employee parking lot in the rear of the administration building garage will be eliminated to provide the site for the office annex.

•

## Creates Brake Division

*Detroit*

• • • **Timken Detroit Axle Co.** has created a new brake division in charge of Ray L. Morrison, formerly general manager of Bendix-Westinghouse Automotive Air Brake Co. Engineer for the division will be Ralph K. Super, previously attached to Timken Axle.

BIG STUFF: *A workman installing a roto-clone ventilation control in the new Studebaker foundry is dwarfed by the size of the mechanism. The clone was ordered along with other pieces with the idea of giving Studebaker the most modern possible facilities.*

# *Introducing* KENNAMETAL TOOLS with "Screwed-on" Tips

## TO HELP YOU CUT TOOLING COSTS ON MANY MACHINING OPERATIONS

Kennametal tools having tips attached with recessed-head screws —an arrangement developed and perfected by Kennametal Inc.—provide a practical, new way of obtaining even better performance from inherently efficient Kennametal.

The screwed-on assembly is a positive, simplified mechanical fastening of streamlined design. The screw, angularly positioned, serves merely to hold the tip firmly in the shank (heat-treated) against the recess walls, which of themselves resist the main cutting thrusts.

These new tools offer you many advantages, including: Easier, cheaper attachment, in your shop, of tip to tool; greater tip durability and more consistent performance; opportunity to interchange tips quickly in same shank; minimized stock keeping.

Kennametal "Screwed-on" tools are now available in larger sizes of fifteen different styles. Standard tips are made, of different Kennametal compositions, for cutting steel, cast iron, or non-ferrous metals. Catalog particulars and prices are yours for the asking.

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(3ST OPPOSITE HAND)

STYLE 12ST
(11ST OPPOSITE HAND)

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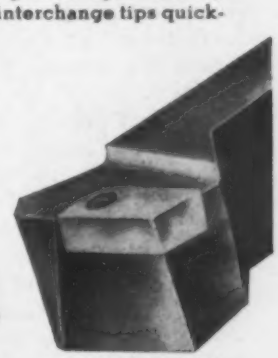
(39ST OPPOSITE HAND)

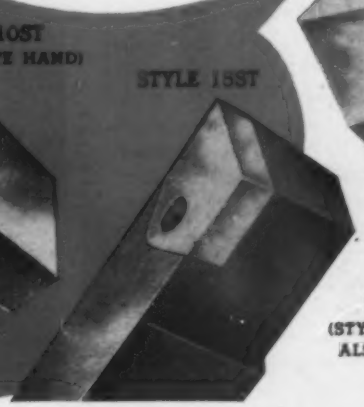


STYLE 21ST

KENNAMETAL
SUPERIOR CEMENTED CARBIDES
KENNAMETAL Inc., LATROBE, PA.

STYLE 2ST
(1ST OPPOSITE HAND)

STYLE 10ST
(9ST OPPOSITE HAND)



STYLE 15ST

STYLE SGS
(STYLES SJL and SWB ALSO AVAILABLE)

# Washington . . . L. W. MOFFETT

**• Senate Military Affairs Committee reports on bill designed to build up and maintain adequate stockpiles of strategic materials.**

WASHINGTON—A stockpiling bill intended to combine in a single and comprehensive piece of legislation all the features desired by and acceptable to the mineral and mining industry and the government departments concerned has been reported by the Senate Military Affairs Committee. A kindred bill has been introduced in the House and consideration by that chamber is expected at an early date to meet the pressing need for such legislation.

The Act of June 7, 1939, which the reported bill is intended to amend has been regarded as inadequate not only by affected industries but by government agencies operating under it. There is additional stockpiling legislation in the Surplus Property Act of 1944 which stipulates that after one year RFC may dispose of government-owned strategic metals and minerals when authorized by SPA upon advice of the Army-Navy Munitions Board as to amounts to be stockpiled for future needs. Therefore, unless Congress acts the Surplus Administrator may on Jan. 3, 1946, authorize the disposal of surplus metals and minerals.

In reporting S.752, the Committee emphasized that the need for such a measure is greater now than ever before because the tremendous consumption of strategic materials during World War II has resulted in an appalling depletion of our domestic resources. It is essential to take steps now to recoup our losses not only by the acquisition of adequate stockpiles but by the development of new sources of domestic supply.

Notwithstanding the fact that we should exert every effort to create an effective peace organization, the Committee expressed the belief that the security of the United States requires the maintenance of an adequate stockpile.

An adequate stockpile must be built up and maintained, the Committee stated, because mineral and other raw materials are the very foundation of the industries which perhaps more than anything else enabled us to emerge victorious in the recent war.

The need for stockpiling strategic and critical materials was recognized by Congress prior to our entry into World War II by passage of the June 7, 1939, stockpiling act. Twenty years earlier, on Dec. 24, 1919, Bernard M. Baruch in a report to President Wilson urged that steps be taken at once to assure adequate supplies of strategic materials to cope with any contingent emergency. It was not until 1938 that $4 million was appropriated for procurement by the Navy of certain strategic materials. The present law enacted in 1939 provided for an appropriation of $100 million for procurement of needed materials by the Treasury Dept.

Our experience of the past five years, the extremely high cost and the altogether too slow progress of our efforts to procure needed materials, the Committee said, attest to the compelling need for our preparedness in the future.

OF particular interest are two special provisions included in the proposed amendment; first, a release provision and, secondly, a "buy American" provision.

The release provision prohibits the disposition of materials no longer needed until six months after notice is given in the Federal Register and transmission to Congress of notice of the proposed distribution. Except where the materials in question are no longer needed by reason of obsolescence of such materials for use in time of war, express approval of the Congress of such disposal is not required. This provision is designed to protect producers and traders against sudden disposals of strategic materials no longer needed in such quantities as might break the market.

Under the proposed amendment, the President is authorized to establish a Strategic Materials Stock-Piling Board in a government agency to be designated by him. The Board is to be headed by a chairman, appointed by and with the consent and advice of the Senate, and will consist of the Secretaries of War, Navy, State, Treasury, Interior, Agriculture and Commerce and their representatives.

The chairman is directed in so far

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REHABILITATION—*These soldiers who have suffered severe spinal injuries are learning to become industrial inspectors. They are checking the precise dimensional measurements of airplane engine valves, at the Percy Jones General Hospital Annex, Fort Custer, Mich.*

*Courtesy Federal Products Corp.*

# Complete Tailor made Machine OR A Simple Fixture


Illustrations on this page show examples of Cincinnati Engineering Service. It encompasses complete equipment from a simple fixture and cutters on a standard machine to completely special machines and tooling tailored to your requirements.

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as possible to appoint and consult with industry advisory committees made up of representatives from producing industries, with respect to the purchase, handling and sale of such materials.

The proposed amendment further provides that the President, acting on the advice of the Board, is to make periodic determinations as to which materials are to be stockpiled, the required quantity and quality of these materials and the dates on which such quantities are to be acquired. This authority may be delegated by the President.

The duties of the Chairman as outlined in the amendment are: (1) To direct the purchase of materials as required by the President's determinations; (2) to provide for storage, security of stockpiles; (3) to provide through regular commercial channels for the refining or processing of available materials into the forms best suited for stockpiling; (4) to provide for rotation of those materials subject to deterioration; (5) to dispose of materials no longer required as determined by the President; and (6) to submit semi-annual reports to the Congress.

In acquisition of materials, the Chairman is required as far as possible to obtain them in excess of the current needs of industry and at a price not greater than the current open market price. The proposed amendment further provides that procurement need not conform with the requirement that purchases be made only following advertisement and bids.

The amendment also sets forth that except as provided for in the act itself, materials in the stockpile can be released only upon order of the President in line with the needs of national defense or in time of war or national emergency, by order of such agency as the President may designate.

MATERIALS belonging to the United States Government, including materials received in exchange for lend-lease aid, and surplus to the needs of the owning agency are to be transferred to the stockpile up to the limits prescribed for such materials. However, there are four exceptions: (1) Contractor inventory; (2) quantities necessary to make up deficiencies of current industrial; (3) small quantities deemed uneconomic to transfer, and (4) materials that cannot be economically converted to meet requirements.

The Secretaries of Interior and Agriculture are directed to make technologic and scientific investigations designed to explore and demonstrate the extent and quality of domestic sources of strategic materials and their substitutes.

The proposed bill also provides that strategic materials purchased abroad for the stockpile may be admitted duty free. However, in any subsequent sale of such materials where the selling cost is based on cost to the United States, the duty is to be included in the price which would otherwise be chargeable were the material imported at the time the sale was made. Petroleum and petroleum products are specifically excluded from coverage by the act.

## *Burrows Appointed SPA Budget Control Disposal Officer*

*Washington*

• • • **Appointment of Don S. Burrows** as assistant administrator for budget management, as a central control over surplus property disposal costs and expenditures, has been announced by SPA. A single control over all surplus property disposal costs, directly under the Surplus Property Administrator, is created by this action which brings to six the SPA assistant administrator posts.

W. Stuart Symington, Administrator, also explained that the assistant administrator for budget management has supervision over cost control and budgetary work in all the disposal agencies. He also has responsibility for outlays for administrative, as well as sales functions incident to surplus property disposal.

Maintenance costs, for example, running into millions of dollars, receive constant scrutiny, he added.

During the current fiscal year, from July 1, 1945, to June 30, 1946, it is estimated that $32 billion of government-owned property in the United States and its possessions will become surplus, almost a third of which will be in aircraft and parts and another third in industrial plant and facilities. The care and maintenance of these and other types of property declared surplus but not immediately disposable is a major item in total disposal costs.

Mr. Burrows was formerly head of the Agencies Div. of SPB and since then has headed the budget management branch of SPA.

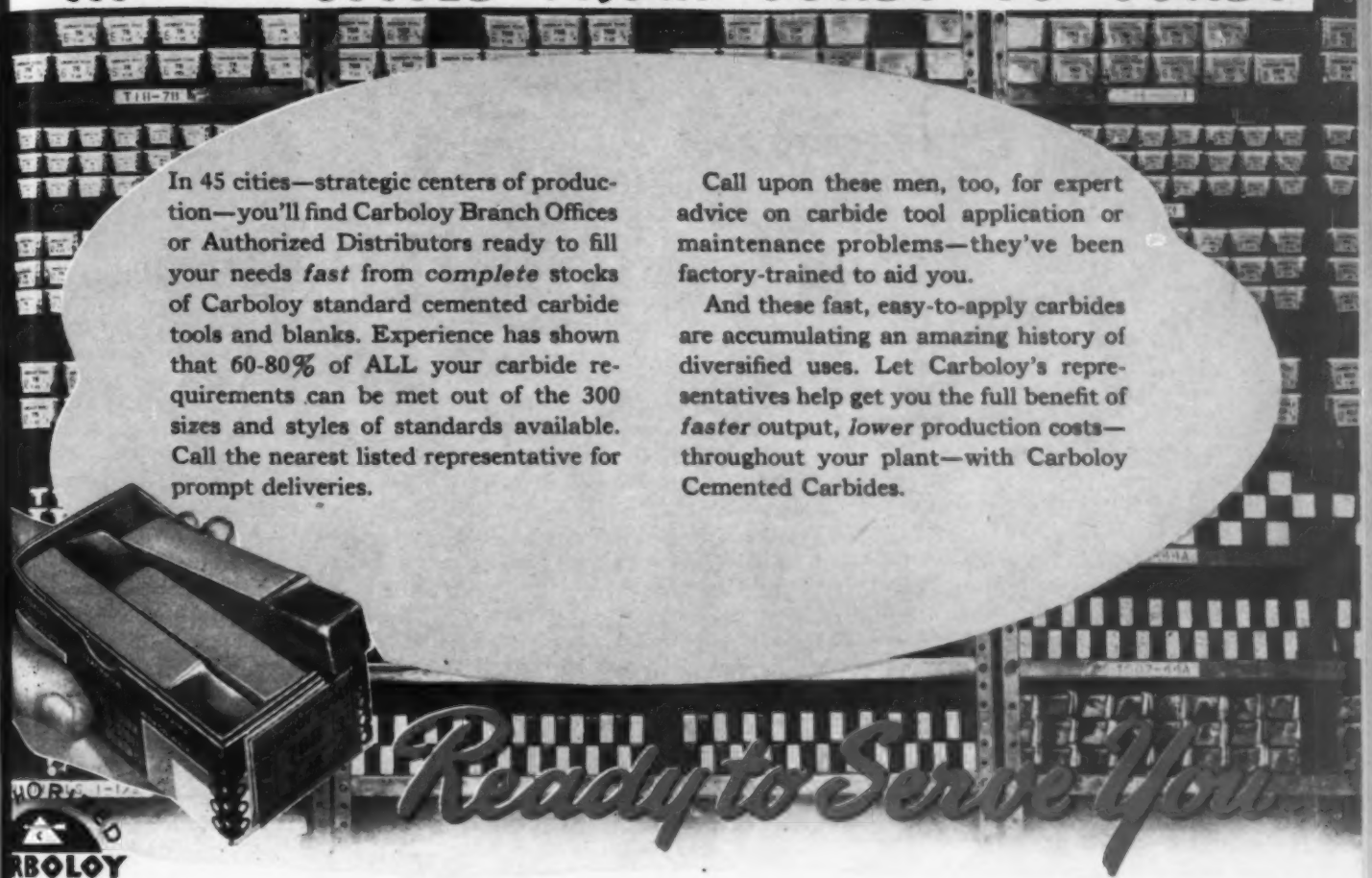
At different times administrative officer for the OPA the Dept. of Labor and other federal agencies, Mr. Burrows has also been associated with Griffenhegen Associates and the American President Lines.

THE BULL OF THE WOODS — BY J. R. WILLIAMS

# Now! LOCAL STOCKS OF CARBOLOY STANDARDS

TRADEMARK

## IN 45 CITIES FROM COAST TO COAST



In 45 cities—strategic centers of production—you'll find Carboloy Branch Offices or Authorized Distributors ready to fill your needs *fast* from *complete* stocks of Carboloy standard cemented carbide tools and blanks. Experience has shown that 60-80% of ALL your carbide requirements can be met out of the 300 sizes and styles of standards available. Call the nearest listed representative for prompt deliveries.

Call upon these men, too, for expert advice on carbide tool application or maintenance problems—they've been factory-trained to aid you.

And these fast, easy-to-apply carbides are accumulating an amazing history of diversified uses. Let Carboloy's representatives help get you the full benefit of *faster* output, *lower* production costs—throughout your plant—with Carboloy Cemented Carbides.

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El Paso, Texas
El Paso Saw & Belting Supply Co.
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W. A. Ramsay, Ltd.
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Portland, Ore. ..... J. E. Haseltine & Co.
St. Louis, Mo. ..... Sligo Iron Store Co.
Salt Lake City, Utah
The Mine & Smelter Supply Co.
Savannah, Ga. .. The Cameron & Barkley Co.
Seattle, Wash. ..... J. E. Haseltine & Co.
South Bend, Indiana . South Bend Supply Co.
Syracuse, N. Y. ..... Syracuse Supply Co.
Tampa, Fla. ..... The Cameron & Barkley Co.
Toledo, Ohio ..... Mill & Factory Supply Co.
Tulsa, Okla.
Marshall Supply & Equipment Co.
Waterbury, Conn. ..... The White Supply Co.
Waterville, Me. ..... Harold W. Kimball Co.
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# CARBOLO

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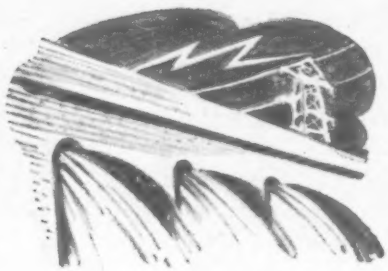
# West Coast . . .

OSGOOD MURDOCK

**• Foundrymen install milk scales, metered oil and water pumps to standardize measuring procedure . . . Design simple apparatus to measure porosity . . . Sealed bids for Geneva imminent.**



SAN FRANCISCO—Joe Silverfoote, the late—but nevertheless real—Paul Bunyan of the California foundry industry plays a return engagement in the second annual report of the foundry sands and mold materials committee of the Northern California Chapter of the American Foundrymen's Assn. The second book from the committee, which will be published this week, runs to more than 150 pages and continues to be an object of amazement for the notoriously close-mouthed foundry industry. The contents represent the result of more than a year of practical research by committee members with free interchange of mutual knowledge and experience in what elsewhere are topics of the greatest secrecy.

The foundrymen's booklet follows the admonition of the well-known English recipe which adjures the reader to "first catch your rabbit." Standard texts for foundrymen—the bibles of the industry — describe standard practice starting at a point after all the unknowns and variables have had a chance to get in their dirty-work. The Foundry Sands and Mold Materials Report Number II is an industry effort to eliminate the chances for error originating from the vagaries of western sands and the idiosyncrasies of individual molders in what they consider to be the "tricks of the trade."

Second important contribution of the cooperative project is the step toward accurate cost determination for the industry. Privately members express the opinion that there is still too much discrepancy between estimating departments on specific jobs varying from plant to plant. Those qualified to express themselves maintain, privately but frankly, that the foundry industry still doesn't know its own costs. To the extent that elimination of cost variables constitutes a contribution to the industry, the report renders another service to the industry.

In a down-to-earth approach to the subject one chapter by W. W. Clark of the Enterprise Engineering & Foundry Co., attacks the problem of variants with a simple and practical suggestion. In order to eliminate guesswork from measuring ingredients Mr. Clark suggests:

"First get a scale—for the sand. Set the tare for two or three balanced wheelbarrows and weigh all the sand. But how about the moisture in the sand? It should and must be known, or you cannot control the moisture of the finished product. It was decided that 1 lb should be added to every 100 lb of sand for each pct of moisture. This is not exact, but it is very close and is easy to show to the sandman.

"Now for your dry binders. Get a milk scale. One can be obtained very cheaply. Hang up the retainer and set the tare at zero. Any additions now are net weight.

"For the oil, get a meter pump that measures in quarter gallons. Get one made to screw into the oil drum, either on the end or sideways. When you set a number of gallons, turn the hand to zero and pump that many gallons. Connect the outlet of the pump direct into the muller and everything will be clean and neat. To measure the water, get a water meter that registers in both gallons and fractions and you can use the exact mix required—no more, no less.

"Last to consider is the mulling time. You can buy all kinds of automatic timers. The best is one with a red light and a big gong. Set it for 8 min. When the time is up the red light flashes and the gong rings plenty loud. Now you have exact time instead of guesswork.

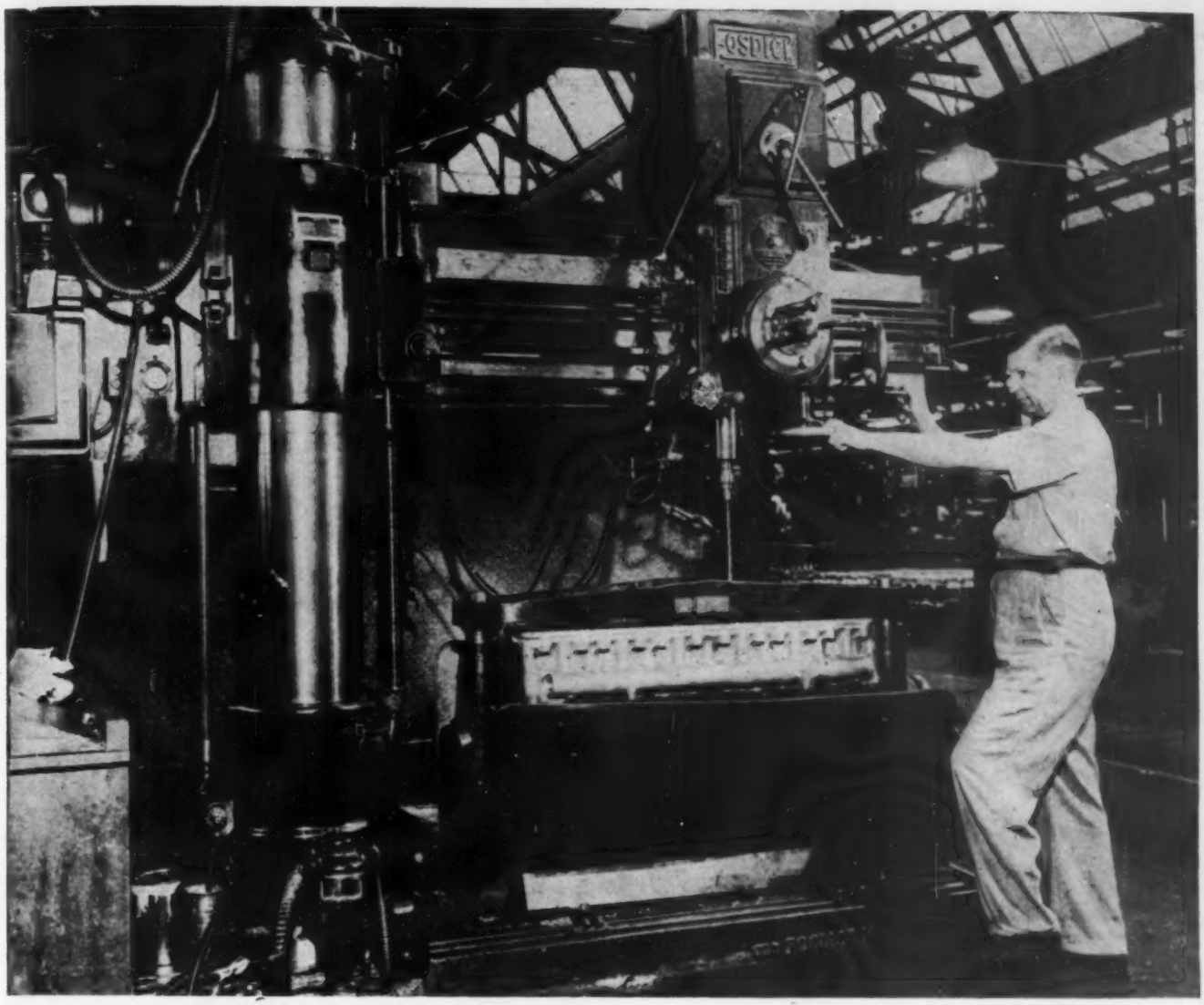
"This whole setup is cheap, and it is not only surprising but quite a relief to discover how closely the mixes will follow a set pattern when everything is weighed accurately.

"And remember, the time consumed in weighing is far less than that of measuring—and far less costly, especially when you count the failures which are turned into successes."

* * *

THESE rugged individualists were not too proud to scorn the assistance of two college professors. Donald W. Mason and Kemal Özkal of Stanford University were among the active participants in the work. "While permeability and strength of molding sands is recognized as being important in sand control practice, porosity, on the other hand is not," according to Mr. Özkal. Defined as the ratio of the volume of open spaces to the total volume of the sand, porosity was the subject of part of Mr. Özkal's research. In order to measure the porosity of a standard AFA sample, a new apparatus was designed which would not harm the sample. The apparatus is described and illustrated in the booklet. The principle involves Boyle's Law (with the measurement conducted under constant temperature). According to Mr. Özkal the volume of gas varies inversely with the pressure. If air in the pores of a sand is expanded to a larger volume and the pressure change is observed, this change in pressure will be inversely proportional to the amount of air in the pores of the specimen.

Simple and foolproof, the apparatus consists of a specimen holder, leveling bottle, expansion chamber, glass and rubber tubing mounted on a board with the scale in inches of mercury. To determine porosity, the apparatus is filled with mercury, the cover closed and the leveling bottle lowered until the level of mercury in the expansion chamber reads zero. Then the stopper is closed and the reading is recorded. The stopper is then opened, and the leveling bottle raised to the proper position. The specimen is then placed in the holder, the cover closed, and the leveling bottle lowered to the po-




# FOSDICK Hydraulic RADIALS

## for quick conversion and operating economy

**A tip on buying Surplus Machine Tools**

Price alone is not a safe measure of value for a used machine tool.

If you contemplate the purchase of a Fosdick Radial—Jig Borer—or High Speed Drill, be certain of its age—its operating condition and how hard it has been used.

We want the users of all Fosdick Machines to get the full value for any machine they buy whether new or purchased from surplus stock.

Therefore we will gladly furnish any information desired on any Surplus Fosdick machine you are considering.

• Illustrated is a Fosdick Radial drilling motor castings. Numerous holes of various diameters are drilled at one setting on a job like this—easily—quickly—accurately.

The hydraulic functions of the machine not only facilitate its control but provide for rapid traverse of the head—operate the column and arm clamp—raise and lower arm—and operate safety nut. In short it will bring modern radial drill operation plus lower drilling, reaming and boring costs to your shop.

Conversion is simple—it requires no special outlay for tools—and its rugged construction assures continued accuracy.

**FOSDICK MACHINE TOOL COMPANY**
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sition from which the second reading is obtained. Mr. Özkal's paper in the foundrymen's report then furnishes the formula by which porosity may be determined. Just as simply as that may one more variable in a business of variants be eliminated.

Mr. Mason, special instructor in foundry practice at Stanford, explores such subjects as comparative gas evolution; price and yield per lb of mold and core washes; effect of moisture content on weight and volume of sand; and comparative results of durability tests by the mold method on local versus Ottawa and Nevada sands with detailed graphs, descriptions and scientific conclusions.

Last but not least, the report also repeats the scale showing the ratio of pounds to gallons to handfuls—which continues possibly, to be one of the greatest contributions to standard practice in the western foundry business.

Far from being static, the sum total of these studies is regarded as a definite forerunner to the purchase and sale of foundry sand to specification.

* * *

IN answer to the ever-recurrent question of "What do you hear about Geneva?", word here from two gubernatorial sources indicates that action is imminent.

Governor Earl Warren of California declared last week that the RFC will, in the near future, call for sealed bids for Geneva and that at least one "satisfactory" bid will be forthcoming.

Apparently more informed on the subject than he is permitted to disclose, Mr. Warren implied strongly that the satisfactory bid would emanate from private sources and would involve outright purchase of the mill. Another governor indicated—off the record—that he is under the same impression. The latter commentator, however, went further and suggested that U. S. Steel was considered to be the logical purchaser and then retreated somewhat by saying that if U. S. Steel did not feel inclined to bid, steps would be taken to interest and encourage other so-called independent steel companies to enter the picture. The aspect of sealed bids and outright purchase—which would have the effect of removing Geneva from the political arena—points, in the opinion of local steel men, directly toward U. S. Steel and coincides with the best information which these men receive from Washington, D. C. In Utah they are betting that U. S. Steel will be operating Geneva by next March. Others hereabouts maintain that the corporation is interested in buying a steel plant but not a flock of lawsuits and indictments.

* * *

QUIETLY enlarging on Bethlehem's recent announcement of an $8 million expansion of their Los Angeles Slauson Ave. plant, company officials are letting it be known that "when present plans are complete production from the southern California mill will be doubled."

Terms of the original announcement indicated that production would be augmented by 40 pct with the addition of a new openhearth. Tenor of present predictions imply either doubling the number of openhearths to eight or else complete rebuilding of the existing three in addition to the new one, in order to effect the 100 pct increase.

Denials by Bethlehem men that they will produce wire nails in their southern California plant are also taken by some with a large grain of salt. A similar lack of detail seems to surround plans for the expansion of Columbia's Pittsburgh plant.

## Home Scrap Important To Canada's Production

*Toronto*

• • • **Canadian production** of steel ingots and castings during October amounted to 205,846 net tons or 68.1 pct. of rated capacity and compares with 198,508 tons or 65.7 pct. for September and 275,524 tons, or 92 pct. for October 1944. Output for the month included 198,185 tons of steel ingots and 7661 tons of castings.

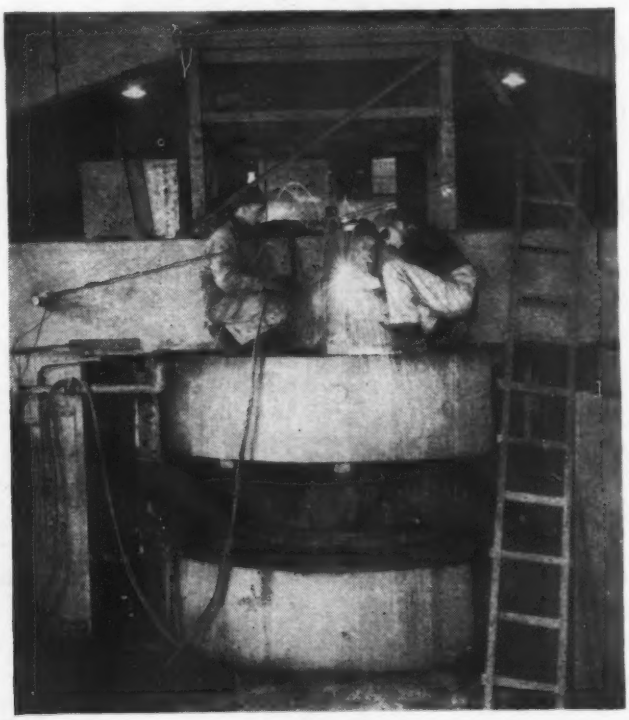
Steel furnace charges for the month included 96,730 tons of pig iron; 63,671 tons of scrap of companies' own production and 66,319 tons of purchased scrap.

For the 10 months ending with October, production of steel ingots and castings totaled 2,454,061 net tons, which compares with 2,517,005 tons for the same period of 1944 and 2,509,712 tons in 1943.

For the 10 months this year, charges to steel furnaces included 1,189,953 tons of pig iron; 801,072 tons of scrap of consumers' own production and 715,034 tons of purchased scrap.

Production of steel ingots and castings for the first 10 months of this year is as follows:

| | |
|---|---|
| January | 268,722 |
| February | 250,464 |
| March | 277,461 |
| April | 274,213 |
| May | 267,643 |
| June | 257,115 |
| July | 229,161 |
| August | 224,928 |
| September | 198,508 |
| October | 205,846 |



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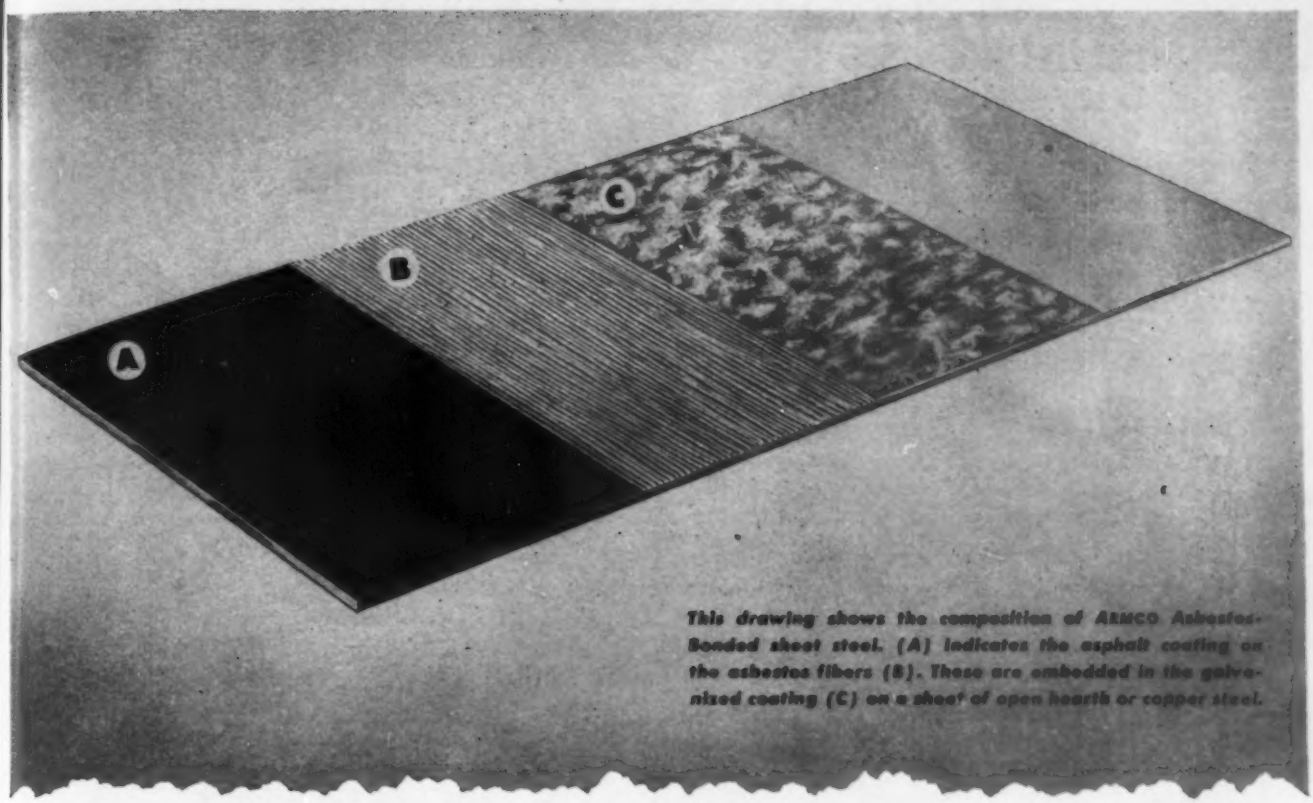
CUT UPS: *A Japanese cyclotron in Tokyo being destroyed with a gas cutting torch as Allied authorities pursue a program of destroying atomic energy research equipment.*

o o o




*This drawing shows the composition of* ARMCO *Asbestos-Bonded sheet steel. (A) indicates the asphalt coating on the asbestos fibers (B). These are embedded in the galvanized coating (C) on a sheet of open hearth or copper steel.*

# here is ASBESTOS-BONDED STEEL···

## *Armco's Newest Coated Sheet*

The newest special-purpose sheet steel for atmospheric, chemical, underground and underwater uses is "ARMCO Asbestos-Bonded Steel."

It is the sheet steel counterpart of ARMCO Asbestos-Bonded Steel Pipe —used successfully for many years in better-grade drainage structures. Now this coated steel is available in sheet form in 16-gage and heavier.

ARMCO Asbestos-Bonded has a coating of zinc with a layer of asbestos felt that is firmly pressed into the zinc coating while it is still molten. The asbestos felt layer is then saturated with hot asphalt. The surface is relatively smooth and uniform and is off-black in color.

### HAS VARIED USES

Because it has exceptional resistance to acids, alkalies, and water, ARMCO Asbestos-Bonded is ideal for products and equipment exposed to severe corrosion. These include various kinds of industrial air conditioning equipment, chemical and salt brine tanks, marine, underground and underwater applications and railway car parts.

You are invited to test ARMCO Asbestos-Bonded sheets for your own products or equipment. Our metallurgists will be glad to work with you. For full information address The American Rolling Mill Company, 3061 Curtis Street, Middletown, Ohio. Export: The Armco International Corporation.

**SPECIAL-PURPOSE SHEET STEELS**

**THE AMERICAN ROLLING MILL COMPANY**

# European Letter . . . JACK R. HIGHT

**• Renault works' nationalization is compromise . . . Steel is limiting factor to present output . . . Coal continues the most acute raw material.**

PARIS — Compromising of traditional left wing views of government ownership is evident in the policies established here for the Renault automotive plant, which the provisional French Government has been operating since its liberation 14 months ago. As explained by the present management of the plant, the system is designed to prevent investment of funds by the government in the firm, even though losses may occur. Under the plan, funds needed recently by the firm for current expenses and repairs of war damage were borrowed from banks, rather than from the government.

Losses at present are largely an academic question due to a tremendous potential market for the product, unless the materials situation becomes so bad that production stops altogether. Although there has been no production in the French automotive industry thus far for civilian consumption, production is getting underway at present on a few passenger cars for the export trade. As in Britain, the drive for foreign exchange is dictating such an allocation scheme. France's need for raw materials at present, is acute, particularly for coal.

The Renault Billancourt works, built largely on islands in the Seine River, has been working constantly since the liberation, partly on the construction of new trucks for the French Army, and also on a large rebuilding and repair contract for the U. S. Army. The latter was particularly satisfactory from the firm's standpoint since it gave opportunity for the company to keep operating much of the plant without the use of any large amount of raw materials. Both contracts are now completed and allocations of trucks are for civilian use.

Truck production immediately following liberation was at the rate of about one unit per day, having stopped completely in May 1944, when the power supply was cut off. Production at the present time amounts to about 70 units per day, except on occasions when scheduled production is interrupted by steel shortages. Prewar production for these works, probably the largest on the Continent, amounted to about 60,000 passenger cars per year and about 20,000 trucks.

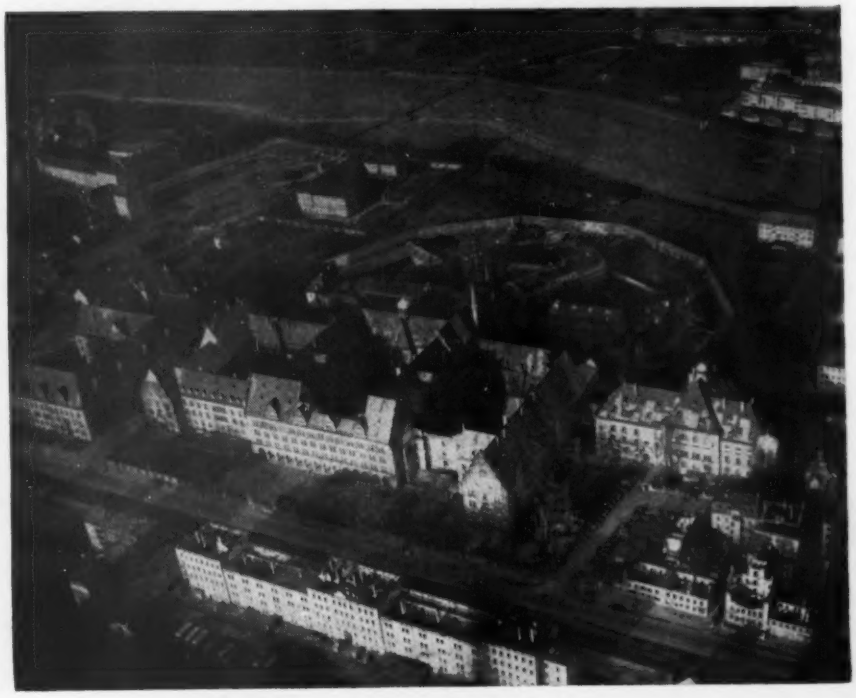
Current production is centered on two truck types, one a ¾ ton style, and a small panel type, while assembly of motors for a 6 hp four-passenger car to be assembled at another works is just beginning. Present schedule for this model is about four per day. Plans are to sell the first passenger model for about 106,000 francs, which at the present rate of exchange, amounts to about $2,000 American.

Fundamentally the Billancourt works are designed for the assembly of passenger cars, so much of the available tooling and assembly line space is going to waste at present. Officials of the firm feel that they could step up production immediately to 200 units per day, if steel were available.

UPON the arrest of Mr. Renault at the time of the liberation of Paris, the plant started immediately to function for the Allies. During the period from 1940 to 1944, under Mr. Renault's guidance the plant has been producing for the Germans. Current comment among plant officials on the subject of his cooperation with the Nazi is best summed up with the statement that "he could have shown a little less good will to them." As an indirect result of this cooperation, the plant is today well equipped with modern tools in a logical layout.

During three heavy bombardment raids by the AAF and the RAF in the occupation period the plant was heavily damaged. Some official opinion states that the works were 80 pct

**TRIBUNAL SCENE:** ***Air view of the International Military Tribunal at Nuernberg, Germany, shows the Nuernberg Palace of Justice (large building in center) and at right the courthouse in which the trials of Hitler's ex-chiefs are being conducted.***



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*Write for Bulletin 8536*

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knocked out each of the three times. Each time the Germans furnished the steel and the brick, and procured the tools for the reconstruction and retooling. Photographs on exhibit as well as a chart of the several scores of direct hits in each raid show some of the scope of the destruction. At present the works are nearly completely rebuilt, although some construction work is still going on.

Due to the conditions of Mr. Renault's arrest the nationalization of the works was not accompanied by any remuneration to the owners of the firm. It was a closed corporation, wholly owned by the family, and the responsible officials carefully point out that the Renault family today is still one of the richest in France, despite the loss of its sweetest plum.

Organization of the firm under the government has caused much concern to Frenchmen who fear that all of the historic objections to government ownership might operate to make the project a failure. As a result, there are many apparently contradictory opinions on the exact status of the firm. Known officially today as Renault Régé National, the workers retain their identity with the firm, and executives state that they are not civil servants. Profits are to go into worker's social measures, according to the present plan.

WAR damage repair is currently underway on the "Autorail" cars which the firm was building for an expanding railway market before the war. Familiar to Continental travelers, these single car units are for high-speed short-run travel on regular rail lines. With their lightweight construction, streamlining and diesel power, they are considered ideal for short-run passenger travel. About 300 units had been completed by Renault before the war, the first of the series in 1931. Successive models since that time had been powered by 250, 300 and 500 hp units, and afforded even greater speeds, cruising at about 85 mph. Eight of the units are in the repair process at the moment, and about 50 more awaiting their turn. Allied strafing caused most of their damage. The company anticipates a greatly expanded market for the Autorail, and hopes that the materials will be available for new construction by the time that repair work on the prewar models is completed.

Although manpower is a serious problem in some other strata of the vertical Renault structure, as far as actual automobile assembly is concerned, supplies are ample. There is some pinch on skilled workers, as it was especially in this category that the Germans drafted slave labor for work in their own plants. As in the case in most French plants today, considerable numbers of German prisoners of war are being used in the foundries and for other heavy labor.

## Metal Group Inaugurated

*London*

• • • **A formal inaugural meeting** of the newly formed Institution of Metallurgists was held recently here in the headquarters of the Iron and Steel Institute and the Institute of Metals. The president of the new professional group is Dr. Harold Moore, who was for many years the director of metallurgical research at the Armament Research Dept., Woolwich, and later director of research for the British Non-Ferrous Metals Research Assn.

In his inaugural address the president referred briefly to the efforts of the past three years that have been devoted to the organization of the new group, and to the intention of gaining recognition and safeguards for the profession.

## BISI Elects President

*London*

• • • **Dr. C. H. Desch, F. R. S.,** is president elect of the British Iron and Steel Institute for 1945, according to an announcement made at the autumn meeting held recently in London. He will take office at the next general meeting of the group, in May of 1946, according to the announcement by Arthur Dorman, retiring president.

Secretary K. Headlam-Morley announced the following changes in the council of the organization; R. Mather becomes a vice-president, and R. A. Hacking becomes a member of the council. Dr. C. F. Goodeve has been elected an honorary member of the council.

## Trying Straw for Fuel

*London*

• • • **Straw is being tried** in Sweden as fuel for the production of steam, due to the extreme shortage of other materials. Shortage of customary coal imports and the unusually dry autumn have both contributed to that country's present plight. Steel mill operations have been curtailed, as well as blast furnaces and charcoal furnaces are being restricted.

Scrap iron and steel supplies are also short, further contributing to the production difficulties. Deliveries have been made from Denmark, but Belgian scrap is reported to be very slow in arriving. High freight rates are preventing imports from the United States to Sweden.

**BUS TRYOUT:** ***Passengers board a new experimental bus just introduced on the streets of London. Among the innovations are two adjacent, mechanically operated doors for entrance and exit, as seen here.***

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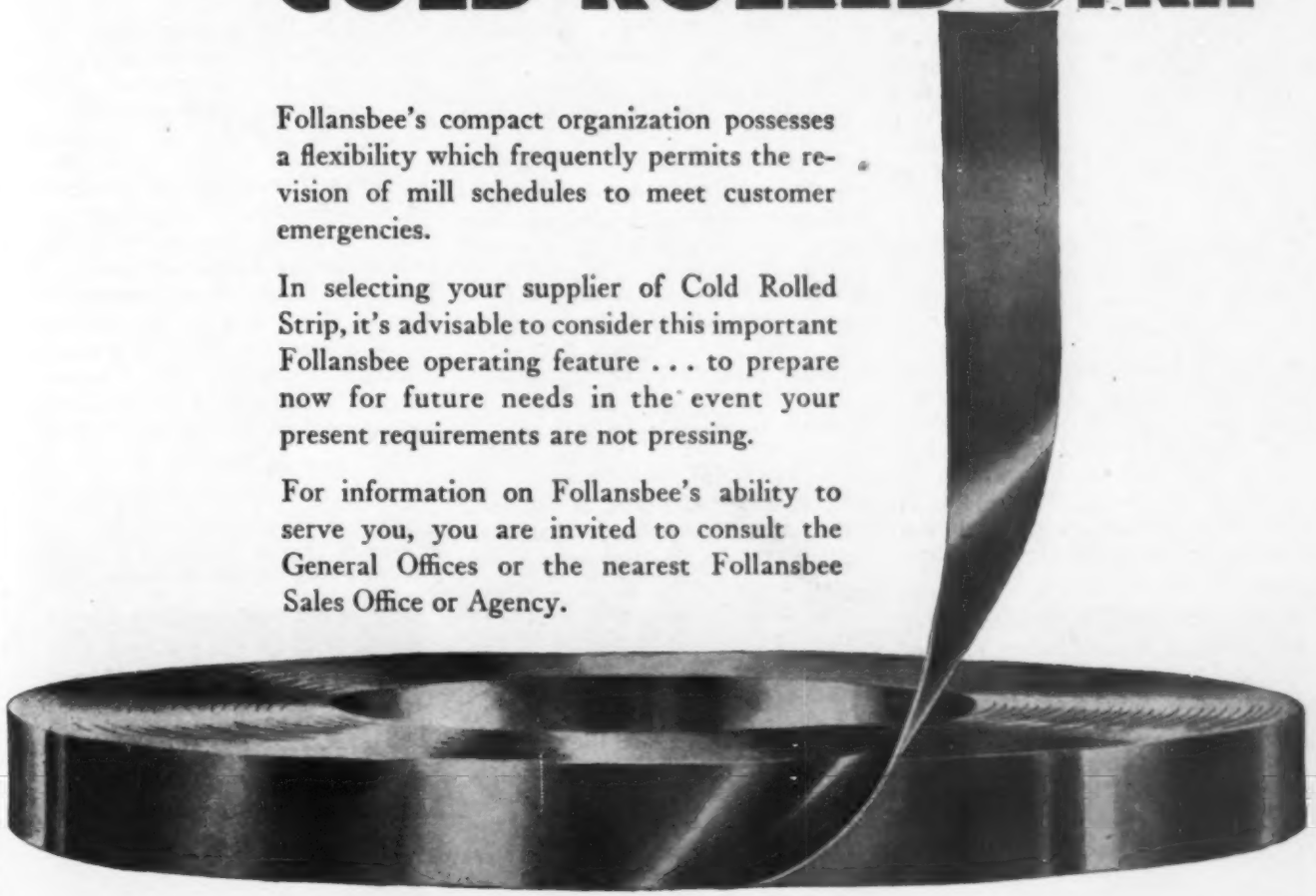
For information on Follansbee's ability to serve you, you are invited to consult the General Offices or the nearest Follansbee Sales Office or Agency.



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# PERSONALS

CLARENCE A. FEE, president and general manager, Abrasive Co.

• **Clarence A. Fee** has become president and general manager of Abrasive Co., Philadelphia, division of Simonds Saw & Steel Co. Mr. Fee assumes the position vacated by **J. W. McLean**, who is retiring after serving in this capacity for 16 yr and being associated with Simonds Saw & Steel Co. for 44 yr.

• **James W. Eben** has been appointed director of advertising and public relations of United Aircraft Products, Inc., Dayton, Ohio.

• **Edward L. Smith** has been appointed purchasing agent of the Electric Appliance Div. of Westinghouse Electric Corp. at Mansfield, Ohio. Mr. Smith, who has been employed at Westinghouse since 1927, succeeds **J. A. Schultz** who was transferred to Mr. Phelps' staff at headquarters in Pittsburgh.

• **Joseph S. Marx**, superintendent of the Carthage, Mo., explosives plant of Hercules Powder Co., will retire Jan. 1, 1946, after 45 yr in the explosives industry. He will be succeeded by **John C. Foster** who arrived at the plant Nov. 1, after more than 3 yr as smokeless powder superintendent at the Hercules-operated Badger Ordnance Works in Wisconsin.

• **R. R. Bauman** has been appointed Chicago area sales representative of the Ajax Flexible Coupling Co., Inc., Westfield, N. Y.

• **A. J. Fisher, Jr.** has been appointed to supervise materials, material control and production of **Martin-Parry Corp.**, York, Pa., and subsidiaries. Mr. Fisher was recently released from Navy service.

• **Harry A. Dennis** has been named sales representative in Erie, Pa., and vicinity, for Lukens Steel Co. and subsidiaries, By-Products Steel Corp. and Lukenweld, Inc., Coatesville, Pa. Mr. Dennis has been associated with Lukens since 1939 and for the last several years has been engaged in welding service engineering work as a member of the technical sales service of the company and its subsidiaries.

• **George C. Tanty**, who has been associated with the Crosley Corp., Cincinnati, for the past 14 months as merchandise manager in the middle west and Pacific coast area, has been appointed southwest regional sales manager. He will represent Crosley in Texas, Oklahoma, Arkansas, Louisiana, and Mississippi. **Inwood Smith** has been made regional sales manager in the central district, which includes Ohio, Kentucky, Michigan and Indiana. **Philip W. Pugh** will be associated with Mr. Smith in the central district as promotional manager.

• **Charles E. Howes** has been appointed assistant manager of sales, Steel Equipment Div., Berger Mfg. Div., Republic Steel Corp., Canton, Ohio.

• **John T. Robbins**, formerly senior process engineer of Curtiss-Wright Corp., has joined the technical service staff of Peter A. Frasse & Co., Inc., New York. Previously with American Rolling Mill Co., and one-time senior metals inspector for U. S. Treasury Dept., Mr. Robbins will represent Frasse as metallurgical consultant, specializing in stainless and corrosion-resistant alloys.

• **W. H. Steele**, one of the top purchasing directors in the United States, has been named director of purchases for the Bendix Home Appliances Corp., South Bend, Ind. For nearly 16 yr, Mr. Steele was with Caterpillar Tractor Co., Peoria, as buyer, assistant purchasing agent, and purchasing agent.

• **Maurice P. Whitney** has been appointed acting general manager of the Eclipse Machine Div. of Bendix Aviation Corp., Elmira, N. Y. Mr. Whitney, who has been chief engineer of the division, succeeds **T. W. Tinkham**, recently resigned.

• **A. Douglas Hannah**, chief of the forgings and castings section of the Steel Div., WPB at Washington, has been elected to be assistant vice-president of the Colonial Trust Co., Pittsburgh. He will assume his new duties on Dec. 15 in the field of customer relations. He had served with the McKay Co. and the Carnegie-Illinois Steel Corp.

• **Ralph B. Rogers** has been made president and general manager of the Indian Motorcycle Co., Springfield, Mass.

• **J. F. Waite** has been appointed assistant to purchasing agent in addition to his duties as commissary agent of the Nashville, Chattanooga & St. Louis Railway, Nashville, Tenn.

• **Otto M. Jensen**, an executive for many years of the Peerless Machine Co., Racine, Wis., has been appointed works manager and vice-president in charge of engineering.

• **John R. Henkle** and **George Hettinger**, after having served in the armed forces, have returned to the sales staff of the Mercury Mfg. Co., Chicago.

• **William J. Priestley** has been elected vice-president in charge of the Alloys & Metals Div. of Union Carbide & Carbon Corp., New York. In July 1944, he was elected president of Electro Metallurgical Co., Electro Metallurgical Co. of Canada, Ltd., Michigan Northern Power Co., and Union Carbide Co. of Canada, Ltd., units of Union Carbide and Carbon Corp.

WILLIAM J. PRIESTLEY, vice-president in charge of Alloys & Metals Div., Union Carbide & Carbon Corp.

• **Arthur A. Ladwig,** factory superintendent for the LeRoi Co., Milwaukee, for the last 9 yr, has been appointed vice-president in charge of manufacturing, and **John M. Dolan,** general sales manager since 1943, has been made vice-president in charge of sales.

• **E. D. Connell,** manager of the merchant iron & steel dept., has been elected vice-president of Iron & Steel Products, Inc., Chicago.

• **A. F. Bortz** has been appointed director of purchases for the Lord Mfg. Co., Erie, Pa., with **D. P. Cobb** as production buyer and **R. F. Gifford** as supplies buyer.

• **Capt. Vincent H. Godfrey,** who recently completed a tour of service in the U. S. Navy, has returned to the Page Steel & Wire Div. of American Chain & Cable Co., Inc., as sales engineer, with headquarters at Monessen, Pa.

• **L. C. Goad,** vice-president, has been appointed a group executive in charge of the General Motors Corp.'s divisions at Dayton—Frigidaire, Delco Products, Moraine Products, Aeroproducts, and Inland Manufacturing; the Delco Appliance Div. at Rochester, N. Y., and also the Buick-Oldsmobile-Pontiac Assembly Div. with plants at Linden, N. J., and Southgate, Calif. **W. S. Roberts,** formerly assistant general manager of the Buick-Oldsmobile-Pontiac Assembly Div., will succeed Mr. Goad as general manager of that division. The Dayton divisions have been under the direction of **E. F. Johnson,** who will relinquish his status as group executive, but who will continue as vice-president of General Motors and a member of the administration committee until the effective date of his retirement, Dec. 31.

• **Charles L. Harris** has been appointed manager of distributor sales of Manning, Maxwell & Moore, Inc., Bridgeport, Conn. **Newton P. Selover** will succeed Mr. Harris as manager of the mid-western district. He will assume his new duties with headquarters in Chicago. **William F. Loos** has been appointed Eastern district manager with headquarters in New York. Under his supervision will also be the northern and southern New England territories as well as the mid-Atlantic district. **William H. Bolin,** with the company since 1922, has been appointed mid-eastern district manager with headquarters in Pittsburgh succeeding Mr. Loos.

**E. FINLEY CARTER, vice-president in charge of engineering, Sylvania Electric Products, Inc.**

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• **E. Finley Carter,** formerly vice-president in charge of industrial relations of Sylvania Electric Products, Inc., Ipswich, Mass., has been named vice-president in charge of engineering following the resignation of **Roger M. Wise.** Mr. Carter was assistant chief engineer of the Radio Div. of Sylvania for a number of years. Earlier, he had been engaged in radio development for General Electric Co. **Howard L. Richardson,** formerly manager of personnel administration, will become director of industrial relations.

• **Harry F. Knapp,** manager of sales, special accounts in Washington, for the Carnegie-Illinois Steel Corp., Pittsburgh, has retired. Mr. Knapp had been connected with the U. S. Steel Corp. subsidiaries for 44 yr, and came to Washington in 1908 to handle his concern's activities in connection with the construction of the Panama Canal. He has been stationed permanently in Washington since 1917.

• **J. K. Keogh** has been appointed manager of the Allis-Chalmers Mfg. Co.'s Pittsburgh district office. Mr. Keogh joined Allis-Chalmers in 1904. He completed the company's training course for graduate students, later joining the service and erection dept.

• **Jules E. Timer,** for more than 10 yr with the Sherman Paper Products Corp., has been made director of trade relations of the International Plastic Corp., Morristown, N. J.

• **Dr. Walter C. Rueckel,** general superintendent of operations, Koppers Co., Inc., Pittsburgh, Engineering & Construction Div., has been appointed New York district sales manager of the division. Dr. Rueckel has been with Koppers since 1938. **Elliott Preston** has been appointed general superintendent of operations to succeed Dr. Rueckel. He formerly was assistant general superintendent and has been with Koppers since 1924.

• **Lt. Thomas M. Riley** has been appointed to manage advertising activities of the Pacific Coast Paint Div., Pittsburgh Plate Glass Co. His headquarters will be at the company's Los Angeles office.

• **Ray W. Turnbull,** president, Edison General Electric Appliance Co., Chicago, has been elected vice-president of National Electrical Manufacturers Assn. in New York.

• **Hickman Price, Jr.,** executive assistant to Joseph W. Frazer, president of Kaiser-Frazer Corp., Willow Run, Mich., has been elected vice-president and treasurer and a member of the board of the company.

• **Alan G. Loofbourrow** has been named chief engineer of the Chrysler Div., succeeding **E. R. Maurer,** transferred to the Engineering Div. of Chrysler Corp., Detroit. Mr. Loofbourrow has been on the staff of the corporation's Engineering Div. since 1935, and has headed the engineering staff of Chrysler's share in the atomic bomb project.

• **William P. Witherow,** president, and **C. H. Lehman,** executive vice-president, Blaw-Knox Co., Pittsburgh, have been elected to the board of directors of Blaw-Knox Ltd., a London affiliate.

• **John C. Fairchild** has been appointed advertising manager for the Ajax Electric Co., Philadelphia.

• **C. J. Bickler** has been appointed manager of sales of Globe Steel Tubes Co.'s Los Angeles office. Mr. Bickler has served as assistant to the vice-president in charge of sales with headquarters in the general sales office at Milwaukee for the past 3 yr. He was in charge of the Welded Tube Div. Prior to that he was manager of sales of the company's Cleveland office.

• **Frank L. Scott, Jr.** has become a member of Ketchum, Inc., Pittsburgh, and vice-president in charge of the Public Relations Div.

## PERSONALS

• **William N. Mackey** has been appointed director of advertising and sales of Newman Bros., Inc., Cincinnati. This will also include work for their subsidiary, Jefferson Machine Tool Co.

• **Robert T. Kain,** recently placed on inactive status by the U. S. Navy, has been appointed San Francisco district manager of the Industrial Products Sales Div. of the B. F. Goodrich Co., Akron, Ohio. Mr. Kain succeeds **H. A. Schulz,** who is retiring after having served with the company 30 yr, all in the Industrial Products Sales Div. He had been San Francisco district manager for the last 4 yr.

• **Charles S. Cheston** has been elected to the board of directors of Monsanto Chemical Co., St. Louis. After having been a partner in the investment banking firm of Smith Barney & Co. and its predecessor for 24 yr, he resigned a year ago. During the war, he served as deputy director of the Army specialists corps and later became assistant director of the Office of Strategic Services.

• **H. M. Munson** has been appointed manager of the newly organized Industrial Instruments Div. of Claud S. Gordon Co., Chicago.

• **Paul K. Ray** has been appointed advertising and sales promotion manager of Carrier Corp., Syracuse, N. Y.

• **William I. Harber** has joined the staff of Bjorksten Laboratories, Chicago, as senior organic chemist.

• **Norman R. Eggleston** has been named sales manager of the North Delaware Sales, Inc., Buffalo. He has been a member of the industrial relations staff of the National Assn. of Manufacturers in New York for the last year.

• **Elmer Rahe** has been appointed sales manager of the Globe-Wernicke Co., Cincinnati.

**G. O. BRITTON, director of sales, Farm Equipment Div., Graham-Paige Motors Corp.**

• **G. O. Britton** has been appointed director of sales for the Farm Equipment Div. of Graham-Paige Motors Corp., Willow Run, Mich. Mr. Britton has had 12 yr of experience in the farm equipment business, starting as district manager for Allis-Chalmers in 1934.

• **Earl Beyerlein,** metallurgist at the Hansell-Elcock Co., Chicago, has joined the Hershey Machine & Foundry Co., foundry dept., Manheim, Pa.

• **H. A. Malcom,** former assistant general sales manager of the Airtemp Div. of Chrysler Corp., Detroit, has been appointed general sales manager.

• **Frank T. Christian** has been appointed chief engineer of the Eclipse Machine Div. of Bendix Aviation Corp., Elmira, N. Y. Mr. Christian has been associated with the Eclipse engineering staff since 1929.

• **Maj. Albert C. Roeth, Jr.,** an Inland Steel Co. employee before entering the service, is one of the Army superexpediters on the atomic bomb project. Maj. Roeth entered the Army in 1942 and a year later was specially selected for assignment in Washington on the project.

• **Joseph Kildare** has been appointed sales manager of Yarnall-Waring Co., Philadelphia; **Frank W. Miller** has been made works manager and **J. Frank Long** has been transferred to Chicago district office as sales engineer. **Charles H. Grosjean,** sales engineer in New York office, is now in charge of Detroit sales office, replacing **C. N. Maxfield,** who has been appointed California district manager with new sales offices in San Francisco and Los Angeles. **Jackson Kemper** has been added to the New York office sales staff, and **Jack Schuyler,** the Los Angeles office.

• **Joseph W. Sears,** district sales engineer at the Link-Belt Co. plant in Dallas, has been appointed district sales manager with headquarters at Houston. **Stuart Penick** has been named district sales engineer at Dallas, to fill the vacancy created by Mr. Sears' transfer.

• **John J. Cronin,** until now industrial relations director for Fisher Body Div., General Motors Corp., Detroit, has been named general manufacturing manager of the division, succeeding the late **George C. Paterson.** He joined Fisher Body in 1918.

• **C. F. Johnson** has joined Watson-Stillman Co., Roselle, N. J., where he is in charge of all engineering in the Forged Steel Fitting and the Bronze & Forged Steel Valve Divs. He will also function as a Watson-Stillman representative in contacting the trade.

# OBITUARY...

• **St. Clair Smith,** 63, consulting and industrial engineer, died Nov. 29 at Stamford, Conn. He received a special award from the War Dept. for his work on the atomic bomb project.

• **Alfred J. Stecker,** founder of the Eureka Vacuum Cleaner Co., Detroit, died recently.

• **Robert D. Landrum,** chemical engineer and executive of Harshaw Chemical Co., Cleveland, and a member of the Technical Salvage Advisory Committee, WPB, died Nov. 30.

• **Edward L. Biersmith, Jr.,** 45, plant manager of the Columbian Steel Tank Co., Kansas City, for the past 5 yr, died Nov. 24.

• **Harry G. Fisk,** 72, who with his father, Noyes W. Fisk, founded the Fisk Rubber Co., Chicopee Falls, Mass., in 1898, and later sold to the U. S. Rubber Co., died at his home in Springfield, Nov. 30.

• **Thomas H. Owen,** purchasing agent for the Art Stove Co., Detroit, until his retirement a few years ago, died recently.

• **George C. Paterson,** general manufacturing manager of the Fisher Body Div. of General Motors Corp., died recently at his home in Detroit. He became general factory manager of all Fisher Body assembly plants in April 1941 and was elevated to general manufacturing manager of the Fisher Body Div. in September 1944.

# Dear Editor:

## AUTO JACK

Sir:

Will you kindly send me the name and address of the manufacturer of an auto jack which locks onto the brake drum on the inside, consisting of an arm that drops down which will support a two ton weight, as described on p. 49 of the Oct. 11 issue.

*LLOYD R. TOEPPE*
*73 W. Delaware Place,*
*Chicago*

● The auto jack that locks onto the brake drum is owned by the Motor Jack Corp. of Grand Rapids, Mich., and is manufactured for them by the Algonac Mfg. Co., Algonac, Mich. The Detroit sales agency is the Jiffy-Lift Sales Co. of Michigan, 601 Barlum Tower, Detroit 26.—Ed.

## INDUCTION HEATING

Sir:

My attention has been called to an article on induction heating which appeared in the Aug. 24, 1944 issue. If you can supply me either with a reprint or a copy, I should appreciate it.

*FERDINAND JEHLE,*
*Director of Engineering*
*Hoffman Specialty Co.,*
*Indianapolis 7*

● Tear sheets of the article "Practical Aspects of Induction Heating" have been forwarded.—Ed.

## POLISHING OF METALS

Sir:

Some time ago you published several articles on electrolytic polishing of metals. We are interested in securing all available data on this subject and would appreciate tear sheets and data on the process. We wish to apply the process to deburring and the smoothing of aluminum castings, also cast iron castings if possible.

*A. F. STEWART,*
*Purchasing Agent*
*Grove Regulator Co.,*
*Oakland 8, Calif.*

● We are sending one of our books of reprinted articles entitled "Finishing and Cleaning Metal Products" which incorporated most of the articles which appeared in THE IRON AGE on the subject you are interested in. You should find therein an answer to about all you want with the possible exception of cast iron castings, and the electrolytic polishing technique isn't particularly applicable here. The technique used with cast iron would, of course, depend on the size and quantity of the product and the shape.—Ed.

## ATOMIC BOMB SIDELIGHTS

Sir:

We attach hereto 10¢, for which please send me a copy of "Atomic Bomb Sidelights."

*J. J. McBRIDE,*
*Engineer Car Construction*
*American Car & Foundry Co.,*
*New York 8*

● Reprint has been forwarded.—Ed.

## MACHINE TOOL INDUSTRY

Sir:

I was surprised to read in the Machine Tool section of the Nov. 8 issue that you had quoted an article published in our local newspaper concerning a recent talk I made to our local Exchange Club. Unfortunately, as is often the case, the local newspaper misquoted or placed the wrong emphasis on some of my remarks. Furthermore, somewhere in the process evidently certain incorrect percentages crept in.

The most glaring error is the statement that 4 pct of machine tools in operation are considered obsolete today. I quoted a figure of 40 pct which you can verify by reference to *American Machinist's* 1945 Inventory, which showed 38 pct of all metal working equipment to be over 10 yr old. This ties in with the 72 pct figure for 1940. Furthermore, in my talk I in no way emphasized China as an export market, merely mentioning China along with other countries.

*RALPH J. KRAUT,*
*President and General Manager*
*Giddings & Lewis Machine Tool Co.,*
*Fond du Lac, Wis.*

● The 4 pct figure was a typographical error. Thanks for drawing our attention to it.—Ed.

## MULTIPLE SPINDLE DRILLING

Sir:

We understand that you have reprints available of an article which appeared in the May 31 issue entitled "Time Allowances for Multiple Spindle Drilling." We would like to obtain five copies of this article and are enclosing 75¢ to cover the cost.

*GEORGE RINGSTAD,*
*Advertising Manager*
*Whitman & Barnes,*
*Detroit 16*

● Reprints have been mailed.—Ed.

## BLAST CLEANING POWDER

Sir:

Please send name of Du Pont branch handling blast cleaning material mentioned in the Nov. 22 issue.

*THOMAS L. PRICE,*
*General Superintendent*
*Galanot Products,*
*Alliance, Ohio*

● The Plastics Div., E. I. du Pont de Nemours & Co., Parlin, N. J., is the source of Lucite blasting cleaning powder No. HM 126 as mentioned in the article "Soft-Grit Blasting of Cylinders," by J. Albin.—Ed.

## GERMAN STEELS

Sir:

We should be pleased if you would kindly send us a copy of the data on "German Tool and Special Steels" as given in your issue dated Sept. 13.

*H. HICKS,*
*Managing Director*
*Sheffield Forge & Rolling Mills Co., Ltd.,*
*Sheffield 3*

● Tear sheets have been mailed.—Ed.

## MOLD PREPARATION

Sir:

In your Oct. 18 issue there appeared an article entitled "Mechanized Coating of Ingot Molds." We would greatly appreciate your supplying us with one or more copies of this if available.

*A. I. BARR,*
*Special Representative*
*Barrett Div.,*
*Allied Chemical & Dye Corp.,*
*New York 6*

● Tear sheets have been mailed.—Ed.

## IRON PIPE FITTINGS

Sir:

One of our very good clients in Brazil is anxious to construct a plant for the manufacture of malleable and wrought iron pipe fittings from ¾ in. to 4 in. He already has a foundry for the production of steel and iron castings, but has no previous experience in making these fittings and has asked us to put him in touch with manufacturers of equipment for this purpose. Although we have been in Latin America for some 35 yr, our principal business is highway and railway construction and we are not familiar with the type of machinery required for this kind of work, and one of your subscribers felt that you might be able to indicate a possible source of supply.

*J. CARTER,*
*Vice-President*
*R. W. Hebard & Co., Inc.,*
*New York 4*

● A list of several manufacturers has been mailed.—Ed.

## SURFACE CLEANING

Sir:

Please send a copy of "Chemistry of Surface Cleaning" by Ray Sanders which appeared in the Apr. 12 issue.

*L. W. KRAFT,*
*Merchandise Testing & Development Laboratory*
*Sears, Roebuck & Co.,*
*Chicago 7*

● Tear sheets have been sent.—Ed.

## STEEL WOOL MACHINERY

Sir:

I would appreciate receiving from you names and addresses of manufacturers of machinery for the manufacture of steel wool.

*BERNARD PRICE*
*Double Bend Mfg. Co.,*
*New York 7*

● There are no machines for making steel wool on the market. These machines are specially made to order by the various steel wool manufacturers, according to their own specifications.—Ed.

# "Get me another Monarch..."

## those flame-hardened beds can certainly take it."


**He is talking about the flame-hardened bed on this Monarch Toolmaker's Lathe, which he's been using since 1939.**

That's what many operators say when asked about turning machines . . . "Get me another Monarch."

They've found from their own experience that those flame-hardened beds last for years and years, without scoring or scratching. They know that Monarchs continue to deliver the highest quality production, with fine finish and close tolerances, because those flame-hardened bedways stay just like new, retaining all the built-in accuracy of the machine.

Easy control counts, too, with operators. They turn more work per day—earn more—with less fatigue. With such accessories as ball-bearing taper attachments, automatic sizing and other Monarch developments, loading and unloading the work is the principal job to be done.

Yes—operators and owners too, say,"Get me another Monarch." Our nearest branch will help you select the new and improved Monarchs you need to beat competition in quality, cost and delivery.

**THE MONARCH MACHINE TOOL COMPANY • SIDNEY, OHIO**

**FACTORY BRANCHES:**

622 West Washington Blvd. Chicago 6, Ill.
801 Fisher Building Detroit 2, Mich.
10465 Carnegie Ave. Cleveland 6, Ohio
635 Industrial Office Bldg. Newark 2, N. J.
512 Empire Building Pittsburgh 22, Pa.
38th and College Ave. Indianapolis, Ind.

*Representatives in Principal Cities*

ACCURACY · ECONOMY · LONG LIFE

**Monarch TURNING MACHINES**

# This Industrial Week . . .

- ***Steel Wage Controversy Heading to Climax***
- ***Neither Side Will Budge from Its Position***
- ***See Enforced Export Allocations***

WITH an industrywide steel strike set for mid-January, there is no longer any speculation as to the seriousness of the impasse between steel management and steel labor. It is true that between now and the time the strike is to be called developments from Washington might forestall such a paralyzing tieup, but hope of averting a strike was exceedingly slim this week.

Steel management is more adamant than ever that no successful negotiations to settle the wage questions can be consummated until the OPA grants steel price relief. On the other hand with the steel union's complete disavowal of President Truman's labor proposals, there was no indication that the USWA would retreat from its militant stand.

A longer-term view of the steel wage situation indicates that the pattern to be followed in the settlement of the automobile workers' strike will probably set the course in the settlement of the steel wage controversy. Regardless of conciliation in the bitter steel labor-management impasse, it is expected that the union, following past practices, will choose to indicate its strength by calling a strike even though it be of short duration.

With the steel wage controversy rolling towards a serious climax, the impact upon the country's reconversion program from a steel strike is only now becoming clearly revealed. Practically all steel consumers are without inventories and most of them are operating on a hand-to-mouth basis utilizing shipments as soon as they are received at their plants. A shutdown of steel shipments from the mills would almost immediately be reflected in the majority of manufacturing plants in the country.

AS if the steel industry was not already troubled enough with its price and wage problems it may soon receive another bombshell in the form of enforced allocation of from 4,000,000 to 5,000,000 tons of steel products for export. Some sources believe that if this plan, which was to have been discussed this week in Washington between the Civilian Production Administration and Steel Industry Advisory Committee, goes through, it may have a drastic effect upon reconversion in this country. With the war over, the steel industry has been allowed to make its own distribution to domestic steel consumers and the sudden plan to enforce allocations for export over and above shipments now being made to foreign countries by steelmakers is coming as a complete surprise to the trade.

According to some sources the enforced exportation of steel products is said to be predicated upon the fallacious idea that American steel companies have not been exporting steel to foreign countries since the war ended. Foreign customers are being given the same treatment as domestic steel users as far as possible without wrecking the slow reconversion in this country. Steel sources assert that the exportation of steel should be handled in the same way that domestic users are being serviced—shipments to be based upon the pattern which existed in the years 1935-39.

It is claimed that to superimpose an enforced allocation upon a volume of regular exports which has been worked out on a normal sales distribution policy would be drastic enough to slow down recovery in this country and eventually prevent the United States from being of greater help in the reconversion of Europe. There is no indication anywhere in the steel industry that European countries should not receive steel. However, the opinion is that foreign loans should not constitute a lien on American production.

Temporarily preoccupied with labor and price problems, steel producers are making strenuous efforts to achieve smooth functioning of rationing systems set up informally by individual producers. Allotment of tonnage is complicated by lack of coordination among companies and each is keeping a sharp watch on competitors' activities to be sure that no prize customers are being weaned away by special treatment. Steel users, conversely, are attempting to play one producer against another, although this is meeting with little success except by a few extremely large consumers. Particularly missed by the steel companies is any provision against placing of duplicate orders.

From a long-range viewpoint the rationing system in the steel industry is having the effect of stabilizing producer-consumer relationships along prewar patterns. Establishment of buying quotas on the basis of tonnages purchased in the prewar period by each customer is tending to eliminate dislocation of orders prevalent during the war.

STEEL warehouses are fighting a losing battle to retain their record volume of sales built up during the war because of the action of some steel mills in cutting down tonnage supplied to distributors. Warehouse stocks currently are at a considerably reduced level.

Steel deliveries are falling further behind and even if no strike occurs in January the present congestion will not be dissolved before the middle of 1946 at the earliest. Deliveries on some hot-rolled carbon bar items are being quoted for January, 1947, although most producers are refusing to schedule that far in advance. Earliest deliveries being quoted on light gage hot-rolled sheet and strip are for second quarter of next year.

Steel ingot operations this week remained unchanged at 83 pct of rated capacity, bearing out the contention that the industry, because of production difficulties, would be unable to operate much higher than current levels.

• **BRITISH SHIPBUILDING**—Orders received for new construction by British yards recently include three 420 ft. cargo steamers for the Argentine Government, four 7000-ton cargo vessels for Portugal and a passenger-cargo combination vessel of 17,000 tons for the same country. Keel was laid recently for the first of two 14,000-ton passenger and cargo liners for Cunard White Star at Clydebank yards.

• **PROBABLE FRENCH PURCHASES** — Among the many commodities which the Dept. of Commerce says likely will be purchased under the Export-Import Bank's $550,000,000 loan to France are steel, agricultural and industrial machinery, transportation equipment and construction materials. The department said that transportation materials will form the bulk of purchases.

• **RAILWAY BRAKE SHOES CRITICAL**—Railroad car brake shoes have been included in the items critical to reconversion. This action has been taken by CPA through amendment to Direction 4 to Priorities Regulation 28. CPA said that a recent survey of Class 1 railroads showed that the inventory of railroad brake shoes has been reduced to about 20 days' supply, compared to a normal inventory of 60 days. Producers, who normally carry a 60-day inventory, CPA said, have virtually none on hand. Under the amended Priorities Regulation 28, manufacturers of brake shoes are now eligible to apply for a CC rating for their bottleneck materials, principally sheet and strip steel.

• **AGRICULTURAL MACHINERY**—Massey-Harris Co., of Canada is taking over a government factory at Manchester, England, for the production of agricultural machinery. Production is intended for the British home market and for export.

• **RFC STEEL SALE**—Indicative of the tight steel situation, the recent offer of RFC to sell 31,000 tons of carbon sheets, 16 to 24 gage, brought forth tenders from prospective purchasers totalling 625,000 tons in the New York area alone. Quantities were also available at Philadelphia and Cleveland.

• **EIRE PRICES**—In view of reduced prices of certain types of imported steels, the Eire Government has ordered new prices for imported rods, squares, flats and angles. The new prices are $100 per ton wholesale and $120 per ton retail.

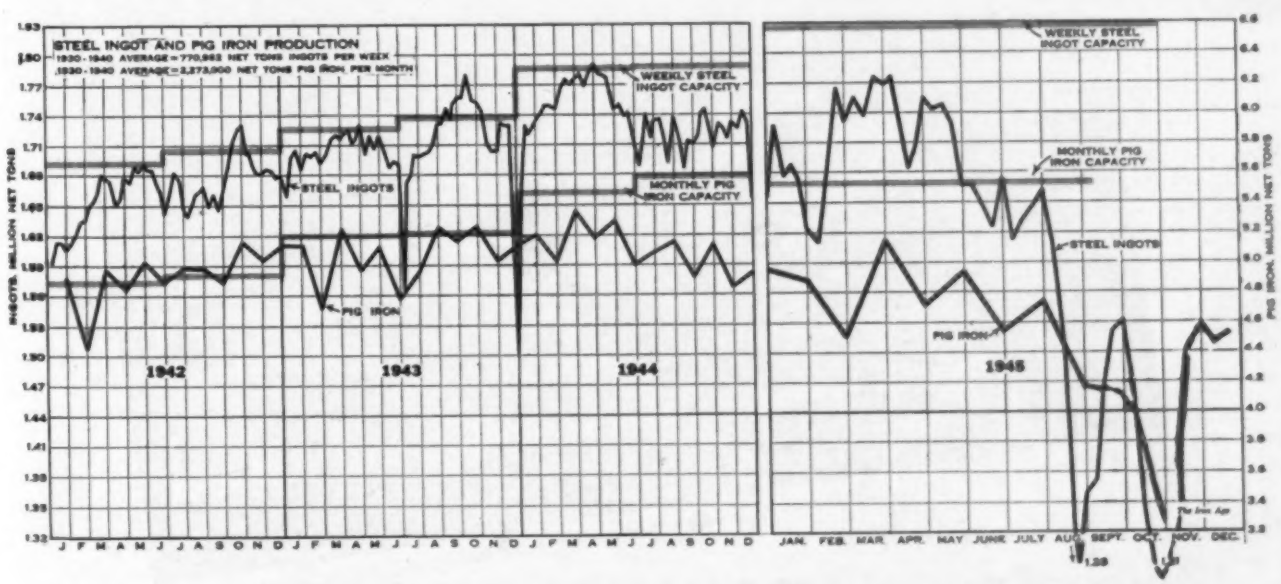
• **BRITISH DIESELS** — John Fowler & Co., Ltd., of Leeds, England, has put into operation its reconversion program for the production of diesel locomotives for industry and tractors. The firm has been engaged in tank production during the war.

• **BOXCAR SHORTAGES**—ODT ascribes the heavier carloadings of grain this year as compared with last as one of the chief reasons for the continued acute shortage of railroad boxcars. In the first 45 weeks of 1945, a total of 2,374,788 cars of grain and grain products were moved as compared with 2,204,387 in the same period of 1944, or an increase of 170,391 cars.

• **SOUTHERN ILLINOIS COAL FOR COKE**—Possibility of utilizing southern Illinois coal for the manufacture of metallurgical coke has been increased by tests on coal from two Franklin County mines of Bell & Zoller Coal Co., it is reported. Tests on coal from the company's Ziegler No. 1 and No. 2 mines showed a sulphur content averaging less than 1 pct, it is stated. The Ziegler mines produce approximately three million tons of coal annually. Low sulphur southern Illinois coal might be substituted for as much as 75 pct of the eastern coal now being used, Dr. M. M. Leighton, chief of the State Geological Survey, recently indicated. Freight rates to Chicago from southern Illinois average $1 a ton less than those on eastern coal.

• **U. S. STEEL SHIPMENTS** — Shipments of finished steel products by subsidiary companies of the U. S. Steel Corp. for November 1945 were 1,346,407. These shipments compare with 1,290,358 net tons in October, an increase of 56,049 net tons, and with 1,743,753 net tons in November 1944, a decrease of 397,346 net tons. Shipments for the first 11 months of 1945 were 17,024,474 net tons compared with 19,383,188 net tons in the comparable period of 1944, a decrease of 2,358,714 net tons.

• **NEW ACQUISITION**—The acquisition of Fort Pitt Mfg. Co. and the Fort Pitt Bedding Co., Pittsburgh, has been announced recently by William T. Kilborn, president of Flannery Bolt Co., Bridgeville. Flannery Bolt, a manufacturer of railroad specialties, will incorporate the facilities of the two acquired companies into its own operation and permit the organization to enter the automotive equipment field. Fort Pitt Mfg. Co., produces seats for trucks and other automotive items.




## *Steel Ingot Production by Districts and Per Cent of Capacity*

| Week of | Pittsburgh | Chicago | Youngstown | Philadelphia | Cleveland | Buffalo | Wheeling | South | Detroit | West | Ohio River | St. Louis | East | Aggregate |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| December 4.... | 78.5 | 91.0 | 80.5 | 80.5 | 85.5 | 102.5 | 77.0 | 95.0 | 99.0 | 50.0 | 76.0 | 70.0 | 88.0 | 83.0 |
| December 11... | 78.0 | 90.0 | 80.0 | 81.5 | 85.0 | 102.5 | 80.0 | 95.0 | 101.0 | 50.0 | 76.0 | 70.0 | 89.5 | 83.0 |

# Steel Industry Facing Enforced Export Allocations

*New York*

By TOM CAMPBELL

• • • As if the steel industry was not already troubled enough with its price and wage problems, it may soon receive a bombshell explosive enough to possibly greatly retard or wreck reconversion in the United States.

It has been learned that the Civilian Production Administration is now in the process of formulating plans for an enforced allocation of from 4,000,000 to 5,000,000 tons of steel products for export. This, it is said, will be in addition to steel products now being exported by steel companies in the normal course of business.

*It is understood that CPA and the Steel Industry Advisory Committee were to have met this week to discuss allocation details.*

While there has been no public announcement of this unusual step, wherein the steel industry will be told how much steel to export, it is understood that the steel industry and its consumers are violently opposed to this coercion. It is further believed by many industrial people that the enforced allocation of steel products for export is but the initial step towards a similar program for manufactured items.

This plan of the CPA probably found its inception in the State Dept. and other governmental agencies dealing with the so-called rehabilitation of Europe and the utilization of U. S. loans now made or to be made to foreign countries.

So strongly do certain sections of American industry think about the enforced allocation of products after the war has ended and after domestic industry is allowed to run their own production on the basis of past-consumer experience that formal resolutions against the plan have already been adopted.

One such resolution definitely states that future misunderstandings can only be avoided if the United States makes it clear to foreign borrowers that the granting of a loan must not constitute a lien on production in this country. Use of loans, it is said, must depend upon what goods are available and in no event, it is argued, should controls be exercised compelling the exportation of any commodity which would jeopardize economic recovery in this country.

According to some sources the enforced exportation of steel products is said to be predicated upon the fallacious idea that American steel companies have not been exporting steel to foreign companies since the war ended. According to reliable information foreign customers are being given the same treatment as domestic steel users as far as possible without wrecking the slow reconversion in this country.

According to reports from abroad as well as at home, customers who before the war purchased steel from American steel companies are being contacted and are already receiving steel on the basis of their prewar pattern. This is the same method which has been utilized for American steel users during periods when demand greatly out-stripped production.

## Steel Exports

*New York*

**• • • According to latest reports total steel export during October were approximately 6.8 pct of total steel produced for shipment. November may run around 7 pct.**

**Enforced allocations now planned by CPA are said to represent tonnages over and above normal export business which is already underway. A summary of the percentage of steel produced which was exported since 1935 is as follows: 1935—6.2 pct; 1936—5.9 pct; 1937—9.7 pct; 1938—8.6 pct; 1939—8.5 pct; 1940—18.5 pct; 1941—8.9 pct; 1942—9.5 pct; 1943—6.4 pct; 1944—6.2 pct; 1945—6.0 pct.**

**The unusually high figure in 1940 was due to the heavy purchases made by the British and French Buying Commissions after the war broke out. From 1941 on exports were controlled by the government. It can be seen that the export percentage during the latter part of this year is already approaching the median in the so-called normal years 1935-39.**

It is obvious, according to reports, that American steelmakers are not able to supply all foreign demands; but on the other hand neither can steel companies anywhere near supply the demand from domestic steel users. As far as can be learned, the present exportation of steel is predicated on the normal prewar period and is not being carried out on a preferential basis. Supporters of this idea, which has been found to be sound in this country, believe that unless some form of recovery and reconversion is successful in this country, the future of European recovery will be black.

First and foremost, it has been learned, that the steel industry would like to exercise the same control over the exportation of steel that it now exercises over domestic production. It is claimed that this is no more than logical in view of the elimination of steel production controls after V-J Day. Events, however, would seem to indicate that despite the end of the war the industry may find itself forced to allocate a certain part of its output under the terms of special war power acts.

Certainly if the steel industry is to be forced into giving up part of its production urgently needed to bring recovery in this country, it will do so only after a bitter fight to shape some of the methods which will probably be used in such allocations. All steel companies have kept definite records of the amount of steel exported in the so-called normal period from 1935 to 1939. It is believed that on the basis of steel company action towards its domestic customers, it will be recommended that no foreign country receive any greater percentage of specific steel products than could be classified as a normal standard.

If this policy is not followed out, a foreign country could take its standard total percentage of steel previously received and jockey it around so as to receive those items which are the least available in this country. Since the steel industry in this country must operate on a definite product mix, it is expected that a demand will be made that allocations conform to this principle in that no product ex-

ceed the industry capacity percentage for such a product.

Since the question of who will supply how much was dominent during the war, it is expected that the industry will naturally insist that the allocations be predicated upon each company's percentage of the particular product capacity with relation to the industry as a whole.

Naturally the main objection, it is believed, to any wholesale, hodgepodge arrangement by governmental authorities without steel market experience is based on the uneconomical long-term plan of taking care of "one-time customers."

If allocations are forced upon the steel industry a check of responsible quarters indicates it will be a bitter pill to swallow because with reconversion in this country already slowed-down due to strikes and excessive demand, any substantial inroads upon American steel production might be the final straw to completely bog down strategic parts of the recovery program.

So strongly do some business sources feel that the recovery program might be stopped by improper exports, that they have gone on record insisting an early American recovery is necessary for a sound and prosperous world economy. They argue that any governmental action prejudicial to such recovery by arbitrary allocations for export of materials needed here will add to the danger of inflation and tend to defeat the goal sought.

To take the attitude that a sick man should take the sustenance from a healthy man until the latter is in the same condition as the former does not spell recovery either for the United States or the world, according to industrial thinking.

## Urges German Steel Industry Be Used For Reconversion

*New York*

• • • **Europe's need for** steel to be used for reconversion purposes and the impending and forced allocation of American steel for export has caused some sources to question the advisability of junking the German steel industry or even reducing it to negligible levels.

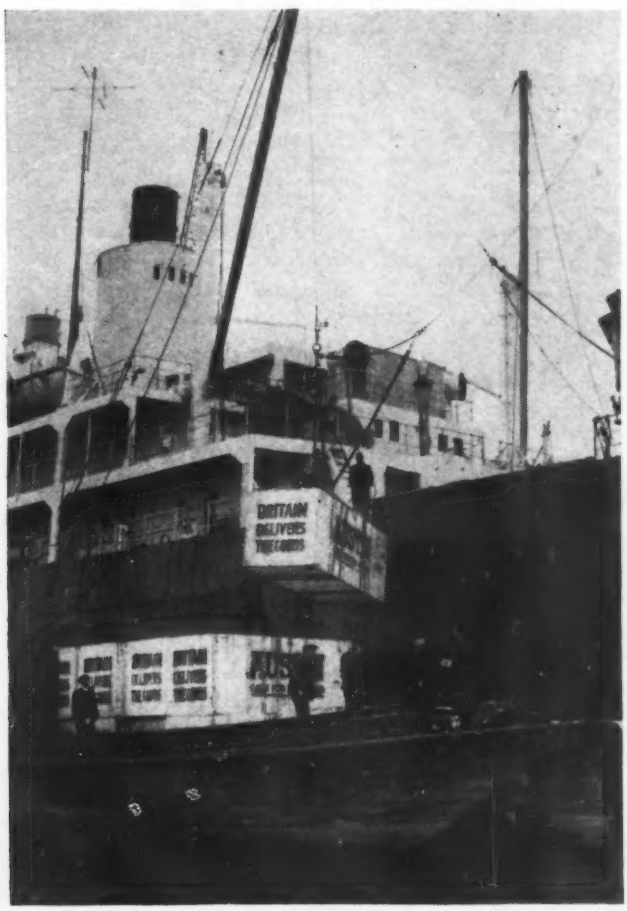
It is argued that at least part of German steel industry under the strict control of the allied governments should be utilized for making the steel necessary to reconvert Europe and also for the manufacture of peace time items. The differences of opinion between the Allies as to how large the German steel industry should be are in part predicated on past history.

France would like to see only a small portion of the German steel industry restored, and even then on the basis of a large amount of semi-finished steel as against finished steel products. The idea behind this, it is believed, is for the purpose of supplying raw steel to France so that French labor can be used in making finished steel products and items.

Great Britain, it is said, would like to see the German steel industry restored to the extent of 10 to 12,000 tons a year with emphasis on the production of semi-finished steel. The reason behind this is said to be Great Britain's past dependence upon the continent for from 4 to 5 tons of semi-finished steel a year. Apparently the English naturally would like to have sources for this material when the reconversion is under way.

Russia and the United States, on the other hand, are said to believe that the German steel industry should be cut down as much as possible, perhaps to 5 to 7 million tons a year. Discussion on this subject, however, would seem to indicate that such a low level of operations for the German steel industry would never allow the country to be economically self-supporting.

There are those in this country who believe that unless enough of German industry is restored for peacetime products the United States and other allied countries may have Germany on their hands forever. By-products from the German steel industry are said to be necessary for the agricultural economy of the country. The final argument in some sources is that as long as Europe needs steel it could be made in Germany to some extent at least during the world reconversion period.

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**SHIPPING RESUMED** — *Loading Austin cars from barges onto the* S.S. Pataroa *at a London dock. This export material was held up recently due to the dock strike in England. England hopes to increase its exports in order to regain its prewar status in international markets.*

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## Offer Production Supplies

*New York*

• • • **Surplus gantry** whirley cranes, overhead traveling cranes, conveyors, attrition mills, ball and roller bearings and other production equipment is offered in N. Y. List No. C-203 by the Surplus Property Div. of RFC at 70 Pine St., New York 5.

# Trend of Strikes Seen Dictating Labor Legislation

*Washington*

By L. W. MOFFETT

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• • • **Variance of opinions** prevails with regard to prospective labor legislation. It is by no means a unanimous view but it perhaps is a dominant belief that unless labor disputes are quickly settled Congress will, after considerable wordage, enact President Truman's proposed "fact finding" bill. It has been introduced in the Senate by Senator Allen J. Ellender of Louisiana, member of the Committee on Education and Labor. It was introduced in the House by Representative **Mary T. Norton**, Chairman of the Committee on Labor.

Moreover, if the epidemic of strikes should increase, the prediction is that labor legislation much stronger than the administration measure will be pushed hard for passage with a chance of success in the House through coalition of Southern Democrats and Republicans. Unless the labor situation was completely out of hand, drastic labor legislation would meet tougher opposition in the Senate.

In any event, action on the Ellender-Norton bill is not expected to be determined by hearings, which were held before the House Committee. Witnesses at the hearings included representatives of the organized groups and of the Chamber of Commerce and the National Assn. of Manufacturers. So in effect the Committee largely was given a briefing of what took place at the recent labor-management conference. Since the President's "fact-finding" legislation was proposed because he considered that the conference was virtually abortive, it is to be assumed that neither labor's nor management's views will carry any great weight, barring the contingency that some basis was established for settling labor troubles without legislation.

**This could easily** be the case in the event of settlement of the pending General Motors strike. Because of its widespread character and the fundamental wage issue it involves with its relation to other strikes and threatened strikes such as in steel, settlement of the G.M. strike clearly would be taken as a pattern to bring about peace between labor and industry generally.

But continued labor-industry warfare, it is confidently expected, will by reason of rising public concern force labor legislation through Congress. It may well be, in the opinion of congressional sources, that even the House will not act quickly on the administration bill. Some estimate that, unless strikes continue to spread, the House may not pass the legislation before spring but that if the epidemic of labor troubles grow it will not only pass after a short discussion but will perhaps be made much more severe.

**FAST RACE:** *Reports seem to indicate that Philip Murray and the CIO are racing against time to provide some security to management against strikes before Congress passes strong labor legislation.*

One possible deterrent to hasty House action is the fact that its members will be up for reelection next year and will have an eye on the political effect of supporting labor legislation. It could be favorable for some members and unfavorable for others, depending upon sentiment in their districts. The Senate, notably more slow to hamper labor activities than the House, might be ready to block the Administration bill entirely if the labor situation does not become worse.

There are those who, however, believe that regardless of developments in labor-management relations both the House and Senate will push the Administration bill through. The thinking behind this view is simple. It is that labor at least was halted in its belligerent demands by President Truman's message asking for fact finding legislation. Hence, it was argued, if only the threat of legislation was so wholesome its enactment would be even more beneficial.

**There is no doubt** that UAW's renewal of negotiations with G.M. was due to the President's message. And despite his explosive condemnation of the President's message, CIO President Phil Murray is reported to have come to taw because of it. Mr. Murray, afraid of what the proposed legislation portends, is said to have suddenly told his UAW leaders to call off their bristling attitude and to offer to talk peace terms with G.M.

Management is divided but generally it shares organized labor's opposition to the Administration's labor bill. Both are concerned over its proposal to setup fact finding boards and the power of subpoena it carries through application of Sec. 11 of the National Labor Relations Act. Management for one thing is apprehensive over what it thinks is the prospect that boards could be consolidated and thus bring about collective bargaining on an industry-wide basis, something which CIO long has advocated. At the same time, organized labor is as sensitive as is management to search of its books and records, not by reason of what the records show, but because of the use to which they might be put in establishing Government control. Labor thus faces the possibility of being boomeranged by Government inspection of its records at a time when it has been asking that the Government be permitted to look into industry's books.

The boards would be set up to investigate and report on labor disputes which "vitally affect the national public interest" where negotiation had failed to bring about settlement through mediation, conciliation or voluntary arbitration. Neither labor nor management would be legally bound to accept the findings of the board. To the claim that this reflects a weakness in the legislation, the Ad-

ministration has responded that the public would have the facts on which to base an opinion of the merits of controversies.

As pointed out by Senator Ellender, it adopts the principles underlying one of the chief features of the Railway Labor Act—the provision for the appointment of emergency boards. Unlike the Railway Labor Act the bill does not undertake to prescribe or regulate the procedures to be followed by employers and employees in negotiations concerning changes in rates of pay, rules or working conditions. While the Railway Labor Act calls for a cooling off period of 60 days, the "fact finding legislation" provides for a cooling off period of 30 days before a strike is called.

**Boards would be set up** by the President upon certification of the Secretary of Labor that mediation and conciliation have failed to settle disputes. Boards would be appointed within five days after certification and would be composed of three or more persons, none of whom has any pecuniary or other private interest in any of the parties to a dispute.

## *Wage Rate Increases To Be Established On 33 pct C/L Increase*

*Washington*

• • • **The cost of living** increase since Jan. 1, 1941, which is the basis on which compensatory wage rate increases may be approved, has been set at 33 pct the Office of the Stabilization Administrator announced Dec. 6. This percentage increase is applied in such adjustments where the increase in average straight time hourly earnings has not equaled the percentage increase in the cost of living since that date.

Regulations for the guidance of stabilization agencies in administering the national wage-price policy established by executive orders issued Aug. 18 and Oct. 30, 1945, were also announced.

At the same time, certain classes of wage increases, which when certified by the stabilization agency, were exempted from the requirement that prior approval of the Stabilization Administrator be secured. These classes are, (1) increases under standards applied by WLB which were in effect prior to Aug. 18, 1945, (2) increases to compensate for rises in the cost of living, and (3) increases to correct inequities in rates paid in different plants in the same industry or locality. Applicants must still secure approval from the agency and when granted may be used as a basis for price ceiling increases or for increasing costs to the government.

Provision is also made for wage adjustments necessary to assure essential production where manpower bottlenecks arise. However, prior approval is not granted until the industry is designated by the Administrator.

Wages or salary adjustments falling within specified classes are automatically approved as increases which may be taken into consideration in determining price or rent ceilings or increased costs to the government as follows: (1) Increases lawfully made or approved by appropriate wage or salary stabilization agency before Aug. 18, 1945; (2) increases made in accordance with a wage or salary schedule lawfully in effect before Aug. 18, 1945; (3) increases made in accordance with requirements with WLB or Stabilization Unit regulations regarding the institution of new price rates or new job rates in line with existing piece or job rates; (4) increases made in accordance with existing orders of WLB regarding increases of up to 55c an hour to correct substandards of living.

OPA is provided with standards to be followed in granting price relief under Executive Order 9651 that unapproved wage or salary adjustments shall be taken into consideration in determining price or rent ceilings after the expiration of a reasonable test period, generally six months. Applicants for price relief are required to submit an operating or financial statement reflecting the effect of the wage increase on costs or showing the employer's profit position during the test period.

Approval of wage or salary adjustments, the regulations provide, does not warrant consequent price increases in any particular amount unless the increase is required under price regulations or administrative standards governing changes in price ceilings. It is also provided that pro-

BOXCAR: *The first new standard steel boxcars, built by Mt. Vernon Car Mfg. Co., a division of H. K. Porter Co. for the ATSF Railway Co., are now rolling from the assembly lines. The cars are steel-sheathed and wood-lined and have a capacity of almost 4000 cu ft.*


## New Stoves Being Delayed

*Cincinanti*

• • • **Prospects of new** model stoves are not expected to be realized before next spring because the manufacturers are too busy meeting current demands to spend the time making necessary changes, Samuel Dunckel, managing director, told the Institute of Heating and Cooking Manufacturers, at its 13th annual convention recently, in Cincinnati. Douglas Whitlock, of Washington, chairman of the advisory board, producers' council, urged a broad research program with an ultimate idea of reducing costs for new homes.

The three-day convention closed with election of the following officers: President, Henry H. Morse, Gardner, Mass.; vice-presidents, M. F. Cotes, Lansing, Mich., Foskett Brown, Nashville, Tenn., Sheldon Coleman, Wichita, Kan, and Alden P. Chester, Kokomo, Ind.; secretary-treasurer, Neil H. Cargyle, Nashville, Tenn.

# Steel Union Wage Action Marks Time for Auto Action

*New York*

By TOM CAMPBELL

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• • • It is more than probable that the experiences of the United Automobile Workers' Union will serve as a pattern for the subsequent actions of the United Steel Workers of America in their tussle with the steel companies. The fact that Philip Murray, fiery CIO head and also chief of the USWA, knows as well as anyone else that unless labor presents some strong propositions which at least will furnish semblance of security against strikes for industrial firms strong legislation towards that end is a definite possibility.

The steel union, however, is unique from some of the other CIO units, just as the steel industry has gotten along with a minimum of show and top executive pronouncements so has Murray's steel union operated quietly but forcibly without the showmanship of the automobile union.

The steel workers' union, although starting out with a nucleus of United Mine Workers officers is now composed of many officials and district officers whose knowledge of the steel industry is anything but meager. Because Mr. Murray has been in the limelight and busy with CIO affairs nationally, the steel union has gone its way and in some quarters has commanded a greater degree of respect than that of other CIO units.

Main objection of the steel industry to the steel union has been its alleged misuse of financial figures with respect to the steel industry's earnings. On the other hand, there has been no demand from the steel union to scrutinize the financial books of any or all of the steel companies. The union's request has been for a flat 30 pct increase. Regardless of newspaper reports and pronouncements of union heads, it is obvious that the steel union would accept something less than a 30 pct increase.

Those conversant with past union tactics, however, believe that despite Presidential and Congressional disapproval, there will be some type of an industrywide work stoppage in the steel industry during January if for no other purpose than to indicate the strength of the union and to enunciate the result of the recent strike vote which was quite a shock to some members of the steel industry.

One of the secrets of the steel workers success over the past several years since it started out from scratch has been in its ability to give the press of the nation a message or an answer without prolonged red tape. The person responsible for such flexibility and who probably has done more from a realistic standpoint for the steel union is a public relations man named Vin Sweeney.

Formerly a labor news reporter for the *Pittsburgh Press* and having behind him a complete knowledge of the steel industry and its labor history "in the old days," he was one of the first persons whom Mr. Murray picked in 1937 when the steel union started out to organize the industry. His method is simple. With whatever message he has, he reaches the newspapers first while the steel industry deliberates on its answer or non-answer to a union statement or accusation.

Now that the steel union has arrived and even though the industry faces a definite threat of a strike, veteran steel observers believe that the steel union is entering a new phase of relationship with the steel industry. Whether or not it can meet the requirements of this remains to be seen, but there is already evidence that the future years will see different tactics towards the steel companies on the part of the steel union.

Already Mr. Murray's assistants in the steel union are so well versed on the general steel question, that his services are not always required except on top policy decisions. The relationship of most steel industry leaders with those union officials who negotiate contracts is substantially more cordial than is indicated by newspaper quotations.

Even at the present time with the union endeavoring to indicate its power and with the steel industry attempting to direct such power in the correct channels by means of more vocal defense of its position over the radio and in the newspapers, it is quite obvious that both sides are shadowboxing until the final showdown comes next year. After that time it is believed both sides will settle down for an extended period without getting into each other's hair.

On the other hand it is fairly obvious that according to informed sources that steelworkers of the USWA have little chance of obtaining a substantial wage increase until the OPA has acted upon the industry's request for higher steel prices to cover previous accumulated costs. For that reason most observers believe that the steel wage case will drag and be full of potential dynamite until the OPA has had time to scan fourth quarter steel earnings sometime in the latter part of January or the early part of February.

Although it may be a wild guess, the following prediction has a good chance of coming true: There will be some sort of a steel work stoppage in January followed by OPA action on steel prices with a resultant compromise in the 30 pct request and an inclusion in contracts of whatever the union appeasement on wildcat strikes of the Ford Motor Car Co. will be. It seems obvious that the steel wage increase will be more than 15 pct but less than 25 pct, and it is also expected that cold figures will convince the OPA that the steel price situation can no longer be a political football and must of necessity be taken care of with a realistic across the board price increase.

## Steel Rate Up

*New York*

**• • • Steel production in November was above the 6,000,000-ton level for the first time since July, as the industry recovered from the adverse effects of the coal strike which crippled production in October, according to the American Iron & Steel Institute.**

**A total of 6,246,759 tons of ingots and steel for castings was produced during the month, compared with a revised total of 5,597,782 tons in October and 7,278,719 tons in November, 1944.**

**Steel operations during November averaged 79.5 pct of capacity, compared with 69.0 pct of capacity in October and a 94.3 pct rate of operations in November, 1944.**

**An average of 1,456,121 tons of steel was produced per week during November, as against a revised figure of 1,263,608 tons per week in October and 1,696,671 tons in November of last year.**

## Small Steel Companies Lose by Sale of C-I Steel Corp. Plant

*Pittsburgh*

• • • **When the Sharon Steel Corp.** takes over on Dec. 15 the operation of its Farrell Works, recently acquired from Carnegie-Illinois Steel Corp., the death knell of hand sheet mills in this district will sound.

Carnegie-Illinois, for many years, supplied sheet bars from Farrell to the many hand sheet mills in this district, as well as to its own MacDonald Mills. Sharon will utilize practically all of the newly acquired steelmaking capacity, thus shutting off the only source of sheet bars to approximately a half dozen companies.

To add coals to the fires of trouble, Jones & Laughlin Steel Corp., the only other supplier of sheet bars in this area, is quietly withdrawing from this market and will not sell this item after the first of next year. Republic Steel, formerly a supplier, has been out of this market for some years.

Among the companies hardest hit by the loss of sheet bar sources are Superior Steel Co., Carnegie, Pa.; Apollo Steel Co., Apollo, Pa.; Mahoning Valley Steel Co., Niles, Ohio; Reeves Steel & Mfg. Co., Dover, Ohio; and Parkersburg Iron & Steel Co., Parkersburg, W. Va. Most of these companies, in addition to rolling sheets from sheet bars, also have various types of sheet fabricating facilities.

Sheet bar customers, on the whole, have been buying this item under the published prices on a contract basis. Without this reduction, or discount, it is believed that these mills would find it impossible to operate. Consequently, with sheet bars being an unattractive item for the producer and a necessity for these sheet mills, an impasse has been reached that may, eventually, mean the end of the hand sheet mills.

Apparently this is not a concerted or premeditated attempt on the part of producers to squeeze the little companies. On the contrary, it is part of an economic change that is in a minor sense revolutionizing the steel industry. The entire steel industry is carefully examining how far it can go on equalization, and it is likely that the day of long hauls from one territory to another on products that are made in the latter area is about done. Already one large producer has curtailed hot rolled sheet shipments to the East because of the equalization factor.

Another factor in this direction that is making itself felt is the gradual recognition that a curtailment of production of non-profitable items, other than the forementioned sheet bars, is inevitable. Steel companies have reached the point that they can no longer afford to lose money on production merely to fill out orders. In this regard, items such as concrete reinforcing bars, certain structurals, nails, and other low or non-profit items may disappear from the product lists of some manufacturers.

## Steel Allocations May Be Required To Assure Product Supply

*Washington*

• • • **Inability of non-integrated** steel producers to secure badly needed semi-finished steel may require the Civilian Production Administration to invoke allocations control over certain types of this material. It is reported that sheet bars and skelp are particularly in scarce supply.

Having followed the policy of revoking wartime controls wherever possible, CPA is reported to be reluctant to reimpose any allocations controls. The consensus seems to be that the situation should be allowed to work itself out from the distribution standpoint after OPA acts with respect to possible price relief. OPA, on the other hand, seems to feel that allocation is the only means of affording relief in the near future. This acute problem may be included on the agenda of the Steel Products Industry Advisory Committee meeting in New York on Dec. 12. Another matter for discussion was that of essential export requirements.

Any allocations plan would almost have to be patterned after the system in effect under the Controlled Materials Plan. The CPA Steel Branch would be required to estimate semi-finished steel production and balance that figure against the estimated demand of the integrated and non-integrated mills. The CPA would

## Old But Still Good

• • • **The accompanying picture** shows some food cans which were made in London prior to 1852 and cached in the Arctic. They were recently found and returned to Ottawa. Many of the cans of food, according to *Tin and Its Uses*, were still intact, in spite of repeated freezings and thawings and exposure to the moist atmosphere. Of the sound cans, some contained stewed ox-cheek which was still wholesome, as was shown by feeding tests on laboratory animals. Other tests showed that no bacteria had lived in the sound cans and no chemical preservatives such as borates or nitrates had been used. The inside surfaces of these cans were still bright and in good condition.

The labels of Henry Gamble of London are still decipherable. Gamble, in partnership with Denkin & Hall, was responsible in laying the foundation of modern industry of canning when in 1811 he first packed foodstuffs in tinplate.

then issue allocation certificates to the non-integrated producers entitling them to receive a certain tonnage of the semi-finished product involved from a specific producer who, in turn, would be notified of the quantities which CPA would require him to supply.

CPA meanwhile is working under a dual handicap. The second war powers act from which CPA and its predecessor agencies derive their allocations and priorities powers expires Dec. 31. However, there is little doubt that Congressional action extending the act will come before that time. Secondly, CPA has been considerably deflated from the size of the WPB and accordingly would prefer not to have additional responsibilities at this time. Civilian Production Administrator Small some weeks ago expressed the hope that CPA's job would be largely finished by the end of this year.

The proposed allocation plan is tied directly to the OPA move to give price relief, if it is desired, to nonintegrated producers while denying it for the present to integrated producers. It has been pointed out that to those nonintegrated producers who are seeking price relief it would be meaningless if they are unable to get the steel. It is said that now some 16 applications for individual upward price adjustments have been filed with OPA, and with only one or two exceptions, none of them has steelmaking capacity. The names of five of the applicants have been published, though they were not given out by OPA officials. These five are Lukens Steel Co., Apollo Steel Co., Continental Steel Co., Superior Steel Co., and Alan Wood Steel Co.

## Car Shortage Anomaly

*Boston*

• • • **Railroads make no** bones of telling scrapyards the freight car situation is still in the hands of armed forces to a certain extent despite the fact that the war is over. What they imply, say shippers, is that armed forces are consulted as to possible car requirements before requests for scrapyard car orders are honored.

Railroad officials do not confirm such reports. They do say the car supply situation along the Eastern Seaboard is tight. In the same breath they say that it is easier for a shipper to obtain a dozen cars or more, than one or two.

## Small Producers Ask Control of Steel Prices

*Pittsburgh*

• • • **Representatives of 56** small steel companies, at an all-day meeting at the William Penn Hotel on Dec. 10 unanimously petitioned OPA to continue price control over their products, according to an OPA statement.

This action was taken after officials of the OPA Steel Section had asked whether small producers wanted suspension of price control. OPA stood ready to lift control of prices for semi-integrated and non-integrated companies while continuing control over prices of integrated producers.

Small producers also asked that in individual cases of petition for price increases, they be given the right to make their petitions individually. This course already is being followed by a number of small companies.

Several companies complained of a lack of supply of semi-finished steel, such as sheet bars and skelp and urged OPA to take whatever steps it can to improve the situation. In this connection it has been learned that CPA is considering allocation of some semi-finished products.

Request also was made that OPA form a standing committee of small producers to act as their spokesman in future negotiations.

All of the questions discussed will be ironed out at a meeting of the General Steel Products Industry Advisory Committee on Dec. 12 at the offices of the American Iron and Steel Institute in New York.

OPA officials at the meeting here included Warren W. Huff, price executive, Metal Branch; Morris Hershon, counsel and W. F. Sterling, chief of the Steel Mill Production Section.

## Acquires New Business

*Bethesda, Md.*

• • • **The engineering and manufacturing** enterprise founded in 1933 by Chase Donaldson and S. W. Briggs as the Briggs Clarifier Co. took its final peacetime form on Dec. 1, when the business was acquired by The Briggs Filtration Co., a Maryland corporation.

The officers of the new company, all of whom served with the old company, are Chase Donaldson, president; S. W. Briggs, vice-president; R. C. Zschiegner, treasurer; W. E. Furey, secretary-counsel; Cecil Hopkins, assistant secretary. The directors are Chase Donaldson, president; S. W. Briggs, vice-president; Richard P. Dunn, partner, Auchincloss, Parker & Redpath; Bradley J. Gaylord, vice-president, The Pennroad Corp., Wilmington, Del.; Clark W. McKnight, Wilmington, Del. Nearly all of the personnel of the old company have been retained.

## COMING EVENTS

Jan. 7-11, 1946—SAE Annual Meeting and Engineering Display, Book-Cadillac Hotel, Detroit.

Jan. 21-23—1946 Convention of Institute of Scrap Iron & Steel, Inc., Congress Hotel, Chicago.

Feb. 4-7—National Meeting, American Welding Society, Hotel Cleveland, Cleveland.

Feb. 4-8—National Metal Exposition, Public Auditorium, Cleveland.

Feb. 4-8—National Metal Congress, Public Auditorium, Cleveland.

Feb. 4-8—American Society for Metals, Statler Hotel, Cleveland.

Feb. 4-8—National Meeting, Iron and Steel Institute of Metals Div., American Institute of Mining and Metallurgical Engineers, Statler Hotel, Cleveland.

Feb. 6-8—American Industrial Radium and X-ray Society, Hollenden Hotel, Cleveland.

Feb. 25-28—Annual Meeting, American Institute of Mining and Metallurgical Engineers, Chicago.

Feb. 25-Mar. 1—Spring Meeting, American Society for Testing Materials, Pittsburgh.

Mar. 28-29—American Gas Assn. Conference on Industrial and Commercial Gas, Toledo, Ohio.

Apr. 3-5—SAE National Aeronautical Meeting, Hotel New Yorker, New York.

Apr. 8-12—ASTE Exposition, Cleveland Public Auditorium, Cleveland.

Apr. 11-13—Spring Congress, Electrochemical Society, Inc., Birmingham, Ala.

Apr. 25-26—Twenty-ninth AIME Annual Open-Hearth Steel and Blast Furnace, and Raw Materials Conferences, Chicago.

May 6-10—Foundry Congress and Foundry Show, American Foundrymen's Assn., Cleveland Auditorium, Cleveland.

June 24-28—Forty-ninth Annual Meeting, American Society for Testing Materials, Buffalo.

# Canada's Steel Capacity Grows But Production Declines

*Toronto*

• • • **Production of iron** and steel in Canada for 1945 fell to the lowest total in four years, despite an increase of 20,400 tons in the capacity of basic openhearth furnaces and 12,000 tons in capacity for production of steel castings. At the end of 1945 Canada's total blast furnace capacity, 14 furnaces, was 2,770,760 net tons; steel ingots, 3,358,600, of which 2,785,400 tons is basic openhearth and 573,200 tons electric; steel castings, 264,800 tons.

Pig iron production for 1945 totalled 1,793,082 net tons, or an average rate of 64.7 pct of rated capacity and compares with 1,852,628 tons for 1944 and with 1,975,015 tons for the all-time-high record year of 1942. Production of steel ingots for 1945 amounted to 2,733,500 net tons for an average of 81.3 pct of rated capacity and compares with 2,878,407 for 1944 and 2,942,921 tons for the record year 1942, and output of steel castings at 135,562 net tons averaged 51.2 pct of capacity and compares with 146,003 tons for 1944 and 178,440 tons for 1942. Production of ferroalloys in 1945 was 187,161 net tons against 182,428 tons in 1944 and compares with the all-time record of 218,687 tons made in 1943.

**Canadian Steel Production**

Net Tons

| Year | Pig Iron | Ferroalloys | Steel Ingots | Steel Castings |
|---|---|---|---|---|
| 1923 | 985,620 | 33,545 | 940,475 | 33,545 |
| 1924 | 664,186 | 29,624 | 700,196 | 28,576 |
| 1925 | 638,844 | 28,794 | 835,016 | 21,100 |
| 1926 | 826,003 | 64,305 | 877,917 | 37,338 |
| 1927 | 792,624 | 62,977 | 972,079 | 44,475 |
| 1928 | 1,162,254 | 50,267 | 1,332,801 | 50,058 |
| 1929 | 1,220,961 | 89,611 | 1,466,688 | 78,562 |
| 1930 | 836,839 | 73,049 | 1,072,321 | 60,830 |
| 1931 | 470,442 | 52,375 | 744,605 | 41,501 |
| 1932 | 161,425 | 18,100 | 349,843 | 25,664 |
| 1933 | 254,592 | 33,737 | 441,346 | 17,830 |
| 1934 | 455,789 | 37,055 | 827,041 | 23,116 |
| 1935 | 678,302 | 62,182 | 1,016,814 | 35,123 |
| 1936 | 759,618 | 87,679 | 1,211,334 | 38,337 |
| 1937 | 1,006,717 | 91,931 | 1,496,575 | 74,652 |
| 1938 | 789,710 | 59,720 | 1,238,078 | 56,636 |
| 1939 | 846,418 | 85,531 | 1,266,056 | 60,997 |
| 1940 | 1,309,161 | 151,661 | 2,177,973 | 77,399 |
| 1941 | 1,528,054 | 213,218 | 2,578,063 | 123,250 |
| 1942 | 1,975,015 | 213,636 | 2,942,921 | 178,440 |
| 1943 | 1,758,265 | 218,687 | 2,848,235 | 148,743 |
| 1944 | 1,852,628 | 182,428 | 2,878,407 | 146,003 |
| 1945* | 1,793,082 | 187,162 | 2,733,500 | 135,562 |

*Production figures for December estimated.

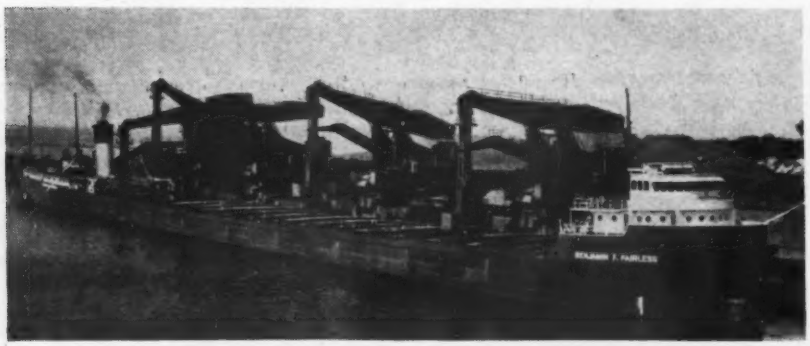
## Iron Ore Shipments Down

*Cleveland*

• • • **Shipments of Lake Superior** iron ore from upper lake ports during November amounted to 4,145,322 gross tons, a decrease of 527,044 tons from November a year ago, according to the monthly report of the Lake Superior Iron Ore Assn. Of this total 4,062,720 tons (including 54,625 tons of Canadian ore from a Superior dock) were from U. S. ports and the balance, 82,602 tons, were from Canadian ports.

Cumulative shipments for the season to Dec. 1 were 75,039,089 tons (including 352,033 tons of Canadian ore from Superior port docks) from U. S. ports compared to 80,691,341 tons to the same date in 1944, and 604,626 tons from Canadian ports which had shipped 479,197 tons to Dec. 1 a year ago. Total cumulative shipments to Dec. 1 were 75,643,715 tons or 5,526,823 tons below the figure of 81,170,538 tons to Dec. 1, 1944.

ORE TRANSPORT: *The* Benjamin F. Fairless *has just finished a world record haul of* 18,543 *tons of iron ore in one trip down the Great Lakes. The vessel transported almost* 525,000 *tons of iron ore during the past season and is one of the reasons why U. S. Steel has* 16 *million tons of ore stocked for winter needs.*



## Canada Has Eight Out of 14 Furnaces In Blast, October

*Toronto*

• • • **Pig iron production** in Canada for October registered a minor gain over September but failed to attain the total reported for October 1944. Output for the month under review amounted to 140,693 net tons which was 60.9 pct of rated capacity and compares with 135,227 tons in September when the rate was 58.5 pct. The month's production included 106,467 tons of basic iron of which 97,155 tons were for further use of producing companies and 9312 tons for sale; 19,203 tons of foundry iron, all for sale and 15,023 tons of malleable iron all for sale.

For the 10 months ending with October, pig iron produced in Canada totaled 1,508,082 net tons, and compares with 1,566,504 tons, in the same period of 1944 and 1,478,760 tons in 1943.

In October, charges of blast furnaces included 233,391 tons of iron ore, 34,917 tons of mill cinder, scale, sinter, etc., and 4,931 tons of scrap iron and steel. At the end of the month 8 furnaces were in blast and 6 blown-out, of a total of 14 stacks in Canada.

Production of ferroalloys in October rose to 14,555 net tons, compared with 13,517 tons in September, and

15,631 tons in October last year. During October, output included by tonnages ferrosilicon, silicomanganese, ferromanganese, ferrochrome, chrom-x and ferrophosphorous.

For the first 10 months of this year production of ferroalloys totalled 158,162 net tons, compared with 154,757 tons for the like period of 1944 and 185,480 tons in 1943.

Following are comparative production figures for pig iron and ferroalloys for 1945 in net tons:

| | Pig Iron | Ferroalloys |
|---|---|---|
| January | 155,969 | 12,130 |
| February | 149,487 | 13,402 |
| March | 165,817 | 16,434 |
| April | 155,070 | 18,350 |
| May | 155,574 | 19,883 |
| June | 159,046 | 18,473 |
| July | 150,387 | 15,750 |
| August | 139,812 | 15,668 |
| September | 135,227 | 13,517 |
| October | 140,693 | 14,555 |
| Total 10 months | 1,508,082 | 158,162 |

## Freight Reduction To Up Coast Scrap Price

*San Francisco*

• • • **Granting a reduction of $2.46** per gross ton in the rail rate from Coast points to Chicago on structural steel and plate scrap will affect the Northwest and Southern California, the rate of $12.32 granted by I.C.C. equalizes a previous rate for scrap lead. Although present supplies and stocks are sufficient to operate Coast furnaces without the 100,000-150,000 tons which will probably be shipped to the Middle West under the new rate, the Far West is loathe to see the quantity of choice non-recurrent material shipped from the area. It is generally expected that little or no shipments will be made from the San Francisco Bay area but that the rate reduction will soon have the effect of increasing quotations at Seattle and Portland by approximately $2.50 and that the California quotations may be expected to increase from $1.00 to $1.50.

## Westinghouse Buys Plant

*Buffalo*

• • • **Westinghouse Electric Corp.** plans to transfer motor, copper wire and welding equipment production from Pittsburgh to this city, it was revealed here following announcement that the RFC had accepted the company's bid of $9,600,000 for the government-owned airport plant in Cheektowaga now occupied by Curtiss-Wright Corp.

Leon R. Ludwig will manage the new plant. Westinghouse is expected to spend about $1,250,000 for alterations to the big factory.

## British Trade Press Decries Government Intervention Policy

*New York*

• • • **It appears that** Great Britain is encountering reconversion obstacles much the same as is the United States, especially with respect to difficulties between government and private industry. This is borne out in the following editorial, "Bureaucracy Must Be Paid For" published in *The Metal Bulletin.*

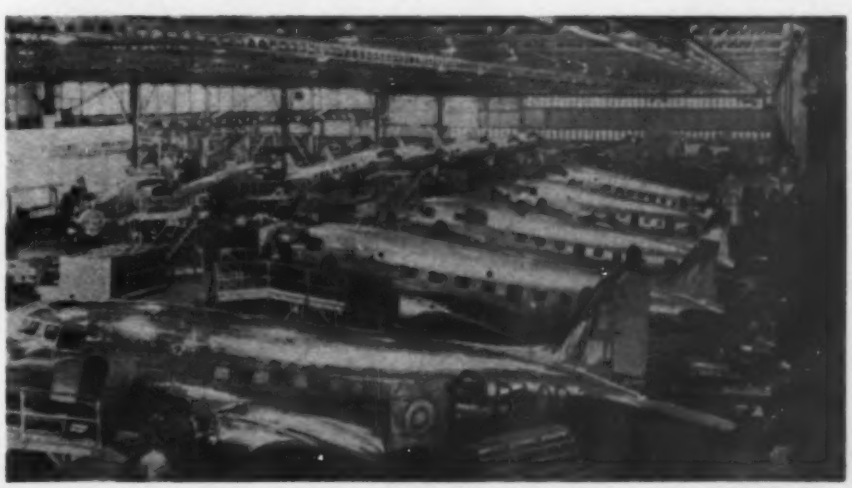
"Every day that passes further enmeshes the Labour Government and the country in the toils of bureaucratic entanglement. Having committed themselves to the attempt to begin the socialisation of Britain and to translate slogans and catch-words into practical politics, our rulers are discovering—if they did not previously know it—that it is impossible to carry out the schemes without wholesale regimentation of industry and of the individual. Hordes of officials will be needed in increasing numbers to supervise all our activities. Even so, no system of State control can ever be perfect until every citizen has one official all to himself to follow him around and every official has another official to watch *him* to ensure that no regulation is infringed. The task is hopeless; already it is impossible for anybody to know all the changing regulations which one should know in order merely to keep out of jail! The whole nation will soon be a race of potential law-breakers. It is not surprising that the Minister of Labour insists on the retention of the Essential Work Order, since in the very nature of things the Government is reluctant to relax any controls, even though these were specifically imposed for the prosecution of the war.

"All this bureaucracy has, however, to be paid for. We remain firm in our conviction that official interference with any industry automatically reduces the efficiency of its operations and raises costs. The ultimate burden has to be borne by the ordinary citizen in the shape of a lower standard of living. Not only will we have to pay for the salaries of unnecessary and trade-hampering officials but also indirectly for the loss of trade which their existence entails. Sir Stafford Cripps can grandiloquently expatiate on the achievements (which satisfy nobody except the purblind theorists in the Labour Government) but the fact remains that if the Government would only leave industry alone or confine its activities to really helping it when help is needed the results would quickly become markedly more satisfactory.

"This, of course, is a vain hope. The Government, on the contrary, is now going into business as builders' merchants on a big scale. Admittedly, private enterprise in this field has not been free from complaints about 'rings' and 'monopolies,' but we gravely doubt whether the introduction of State trading will improve matters in the least. We believe it will have the opposite effect and will defer the advent of cheaper housing indefinitely.

"Well, we shall all be wiser when the present series of socialistic experiments have run their course. But it's a pity that Britain has chosen the role of guinea-pig."

PLANE CONVERSION: *Hangar in Montreal, Canada, is the scene of one of many conversion jobs being carried out, whereby planes are stripped of service insignia, cleaned of war paint, reconstructed and equipped with rebuilt engines for use in civilian air transport service.*



# Percentage Gain in Ingot Capacity Greatest in West

. . By S. H. BARMASEL . .

*New York*

• • • **For the first time** in approximately 14 yr. THE IRON AGE presents a breakdown of steel capacity figures by districts used in compiling its weekly steel ingot operating rate. These districts differ from those used by other sources in that they include a smaller area and are thereby more clearly defined.

Since 1936, rated steel capacity throughout the nation increased from 77,852,000 net tons to 95,503,000 net tons. The greatest percentage gain occurred in the Western district as a result of the government policy to decentralize the steel industry. From producing 2.6 pct of the nation's ingot steel, this center now has 5.7 pct of total productive capacity. Greatest percentage decline during the nine year period 1936-45 came in Chicago, which fell from 21 pct in 1936 to 19.8 pct this past year.

During the ensuing years, it is likely that the only changes in capacity will be slight as obsolescent equipment brought back into service because of the pressure of war needs will be retired.

## Steel Ingot Capacity By Districts

| DISTRICT—COMPANY | Rated Annual Capacity—Net Tons 1936 | 1938 | 1945 |
|---|---|---|---|
| **PITTSBURGH** | | | |
| Allegheny Ludlum Steel Co. | 523,040 | 549,378 | 394,850 |
| American Locomotive Co. | 103,040 | 103,040 | 103,000 |
| American Rolling Mill Co. | 649,600 | 672,000 | 891,000 |
| American Steel & Wire Co. | 702,240 | 702,240 | 842,000 |
| Babcock & Wilcox Tube Co. | ..... | ..... | 50,400 |
| Bethlehem Steel Co. | 1,367,600 | 1,794,912 | 1,900,000 |
| Braeburn Alloy Steel Corp. | 5,645 | 14,224 | 20,730 |
| Byers, A. M. Co. | ..... | ..... | 150,000 |
| Carnegie-Illinois Steel Corp. | | | |
| Clairton | 504,000 | 805,280 | 805,000 |
| Duquesne | 1,904,000 | 2,038,400 | 2,146,800 |
| Edgar Thomson | 1,680,000 | 1,820,000 | 2,297,000 |
| Homestead | 3,136,000 | 3,267,040 | 4,732,000 |
| Johnstown | ..... | ..... | 24,400 |
| Vandergrift | 380,800 | 403,200 | 500,000 |
| Total | 7,604,800 | 8,333,920 | 5,052,200 |
| Colonial Steel Co. | 58,240 | 39,200 | 7,020 |
| Crucible Steel Co. | | | |
| La Belle | 23,330 | 3,920 | 3,780 |
| Midland | 672,000 | 672,000 | 1,034,400 |
| Park | 134,400 | 160,384 | 181,500 |
| Total | 829,730 | 836,304 | 1,219,680 |
| Edgewater Steel Co. | 84,000 | 84,000 | 140,170 |
| Firth Stirling Steel Co. | 16,222 | 12,694 | 17,540 |
| Heppenstall Steel Co. | 42,560 | 42,560 | 42,560 |
| Jessop Steel Co. | 17,920 | 17,920 | 50,000 |
| Jones & Laughlin Steel Corp. | | | |
| Aliquippa | 1,622,880 | 1,724,800 | 1,764,000 |
| Pittsburgh | 2,476,320 | 2,374,400 | 2,233,500 |
| Total | 4,099,200 | 4,099,200 | 3,997,500 |
| Latrobe Electric Steel Co. | 13,440 | 13,440 | 12,000 |
| Mesta Machine Co. | 72,800 | 77,124 | 105,000 |
| National Tube Co. | 1,077,440 | 1,077,440 | 1,200,000 |
| Pittsburgh Steel Co. | 806,400 | 906,460 | 1,072,000 |
| Union Electric Steel Corp. | 10,080 | 10,080 | 25,200 |
| United Engineering & Foundry Co. | ..... | 1,120 | ..... |
| Universal-Cyclops Steel Corp. | 33,600 | 39,160 | 54,120 |
| Vanadium Alloys Steel Co. | 5,600 | 5,600 | 11,910 |
| Vulcan Crucible Steel Co. | 4,234 | 4,234 | 9,600 |
| TOTAL Pittsburgh District | 18,554,743 | 19,436,250 | 22,521,400 |
| **CHICAGO** | | | |
| American Locomotive Co. | 78,400 | 78,400 | 78,000 |
| American Steel & Wire Co. | 336,000 | 336,000 | 610,400 |
| Carnegie-Illinois Steel Corp. | | | |
| Gary | 5,855,360 | 5,629,120 | 5,718,800 |
| South Works | 4,874,240 | 4,341,120 | 4,525,000 |
| Total | 10,729,600 | 9,970,240 | 10,243,800 |
| Columbia Tool Steel Co. | 4,480 | 4,480 | 6,600 |
| Continental Steel Corp. | 313,600 | 364,000 | 364,000 |
| Defense Plant Corp. | | | |
| South Chicago | ..... | ..... | 80,000 |
| East Chicago | ..... | ..... | 120,000 |
| Total | ..... | ..... | 200,000 |
| Ingersoll Steel & Disc Div. (Borg-Warner Corp.) | 14,757 | 14,757 | 24,000 |
| Inland Steel Co. | 2,620,800 | 3,091,200 | 3,400,000 |
| Joslyn Mfg. & Supply Co. | ..... | 16,800 | 37,500 |
| Northwestern Steel & Wire Co. | 33,600 | 369,600 | 321,000 |
| Republic Steel Co. | 456,960 | 491,600 | 1,301,000 |
| International Harvester Co. | 769,104 | 672,000 | 900,000 |
| Youngstown Sheet & Tube Co. | 1,064,000 | 1,064,000 | 1,446,000 |
| TOTAL Chicago District | 16,421,301 | 16,463,077 | 18,932,300 |

| DISTRICT—COMPANY | Rated Annual Capacity—Net Tons 1936 | 1938 | 1945 |
|---|---|---|---|
| **VALLEYS (Youngstown)** | | | |
| Barium Steel Corp. | 11,290 | 6,720 | 50,000 |
| Carnegie-Illinois Steel Corp. | | | |
| Farrell* | 896,000 | 812,000 | 1,050,000 |
| Youngstown | 2,060,800 | 2,228,800 | 2,344,000 |
| Total | 2,956,800 | 3,040,800 | 3,394,000 |
| Copperweld Steel Co. | ..... | ..... | 321,360 |
| Empire Steel Corp. | 343,298 | 332,640 | 348,540 |
| Republic Steel Co. | | | |
| Canton | 1,179,380 | 879,200 | 1,445,000 |
| Massillon | 585,760 | 610,400 | 610,000 |
| Warren | 734,720 | 744,800 | 950,000 |
| Youngstown | 1,705,780 | 1,696,800 | 2,350,000 |
| Total | 4,205,600 | 3,931,200 | 5,355,000 |
| Sharon Steel Corp. | 504,000 | 560,000 | 636,000 |
| Timken Steel & Tube Co. | 336,000 | 443,968 | 547,200 |
| Youngstown Sheet & Tube Co. | | | |
| Brier Hill | 940,800 | 940,800 | 1,104,000 |
| Campbell | 1,489,600 | 1,489,600 | 1,452,000 |
| Total | 2,430,400 | 2,430,400 | 2,556,000 |
| TOTAL Valleys District | 10,787,388 | 10,745,728 | 13,208,100 |

* Acquired by Sharon Steel Co., Nov. 10, 1945.

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| | | | |
|---|---|---|---|
| **PHILADELPHIA** | | | |
| Alan Wood Steel Co. | 739,200 | 739,200 | 550,000 |
| American Bridge Co. (Carnegie-Illinois) | 268,800 | 241,920 | ..... |
| Bethlehem Steel Co. | | | |
| Bethlehem | 2,013,760 | 2,027,200 | 2,503,000 |
| Sparrows Point | 2,813,664 | 3,315,424 | 4,075,000 |
| Steelton | 709,632 | 709,632 | 740,000 |
| Total | 5,537,056 | 6,052,256 | 7,318,000 |
| Carpenter Steel Co. | 43,904 | 43,904 | 74,880 |
| Central Iron & Steel Co. | 336,000 | 336,000 | 336,000 |
| Henry Disston & Sons, Inc. | 13,440 | 18,592 | 25,000 |
| Harrisburg Steel Corp. | 86,800 | 86,800 | 100,750 |
| Lukens Steel Co. | 844,480 | 714,336 | 624,000 |
| Midvale Co. | 300,187 | 300,187 | 519,370 |
| Newport News Shipbuilding & Drydock Co. | 2,464 | 2,464 | 7,500 |
| Old Dominion Iron & Steel Works (Lebanon Steel & Iron) | 2,800 | 8,624 | ..... |
| Phoenix Iron Co. | 231,616 | 231,616 | 231,400 |
| J. A. Roebling's Sons Co. | 212,800 | 196,000 | 253,000 |
| Rustless Iron & Steel Corp. | 21,132 | 50,400 | 114,000 |
| Standard Steel Works (Baldwin) | 123,984 | 133,983 | 169,930 |
| U. S. Naval Gun Factory | 2,016 | ..... | ..... |
| Worth Steel Co. | 423,360 | 423,360 | 460,000 |
| TOTAL Philadelphia District | 9,190,039 | 9,579,642 | 10,783,830 |
| **CLEVELAND** | | | |
| Jones & Laughlin Steel Co. (Otis Steel Div.) | 843,360 | 927,360 | 1,026,900 |
| National Tube Co. | 1,747,200 | 1,747,200 | 1,944,000 |
| Republic Steel Co. | 1,480,640 | 1,537,760 | 1,570,000 |
| TOTAL Cleveland District | 4,071,200 | 4,212,320 | 4,540,900 |

# The Iron Age Districts Annual Steel Capacity

*In net tons—000 omitted*

## 1936—1938—1945

*Source: American Iron & Steel Institute Directory*
*Compilations by Districts: The Iron Age*

| District | 1936 | | 1938 | | 1945 | |
|---|---|---|---|---|---|---|
| | Net Tons | Pct of Total | Net Tons | Pct of Total | Net Tons | Pct of Total |
| Pittsburgh | 18,555 | 23.83 | 19,436 | 23.62 | 22,521 | 23.58 |
| Chicago | 16,421 | 21.09 | 16,463 | 20.01 | 18,932 | 19.82 |
| Youngstown | 10,787 | 13.86 | 10,746 | 13.06 | 13,208 | 13.83 |
| Philadelphia | 9,190 | 11.80 | 9,580 | 11.64 | 10,784 | 11.29 |
| Cleveland | 4,071 | 5.23 | 4,212 | 5.12 | 4,541 | 4.75 |
| Buffalo | 3,890 | 5.00 | 4,007 | 4.87 | 4,443 | 4.65 |
| Wheeling | 3,662 | 4.70 | 3,836 | 4.67 | 3,320 | 3.48 |
| Southern | 2,616 | 3.36 | 3,742 | 4.55 | 3,701 | 3.88 |
| Detroit | 2,234 | 2.87 | 3,313 | 4.03 | 3,190 | 3.34 |
| West | 2,034 | 2.61 | 2,147 | 2.61 | 5,467 | 5.72 |
| South Ohio River | 2,379 | 3.06 | 2,632 | 3.20 | 2,760 | 2.89 |
| St. Louis | 1,436 | 1.84 | 1,556 | 1.89 | 1,758 | 1.84 |
| Eastern | 577 | 0.74 | 612 | 0.74 | 879 | 0.92 |
| Total | 77,852 | 100.00 | 82,282 | 100.00 | 95,503 | 100.00 |

| DISTRICT—COMPANY | Rated Annual Capacity—Net Tons 1936 | 1938 | 1945 |
|---|---|---|---|
| **BUFFALO** | | | |
| Allegheny Ludlum Steel Co. | | | |
| Dunkirk | 16,800 | 16,800 | 33,000 |
| Tonawanda | ..... | ..... | 4,500 |
| Total | 16,800 | 16,800 | 37,500 |
| Bethlehem Steel Corp. | 2,849,025 | 2,897,864 | 3,120,000 |
| Erie Forge Co. | 22,960 | 84,960 | 80,000 |
| Erie Forge & Steel Co. | 76,875 | 84,672 | 128,950 |
| National Forge & Ordnance Co. | 11,200 | 11,200 | 25,000 |
| Republic Steel Corp. | 633,920 | 750,400 | 850,000 |
| Simonds Saw & Steel Co. | 11,200 | 13,440 | 21,600 |
| Wickwire Spencer Steel Co. | 168,000 | 168,000 | 180,000 |
| TOTAL Buffalo District | 3,589,980 | 4,007,136 | 4,446,575 |
| **WHEELING** | | | |
| Carnegie-Illinois Steel Corp. | 672,000 | 672,000 | ..... |
| Follansbee Brothers | | | |
| Follansbee | 100,800 | 84,000 | ..... |
| Toronto | 123,200 | 123,200 | 126,000 |
| Total | 224,000 | 207,200 | 126,000 |
| National Steel Corp. | | | |
| Weirton Steel Co. | 1,478,400 | 1,612,800 | 1,650,000 |
| Wheeling Steel Corp. | | | |
| Benwood | 280,000 | 336,000 | 336,000 |
| Steubenville | 1,008,000 | 1,008,000 | 1,008,000 |
| Total | 1,288,000 | 1,344,000 | 1,344,000 |
| TOTAL Wheeling District | 3,662,400 | 3,836,000 | 3,320,000 |
| **SOUTHERN** | | | |
| Atlantic Steel Co. | 153,485 | 153,485 | 154,000 |
| Connors Steel Co. | ..... | ..... | 60,000 |
| Kilby Steel Co. | 16,800 | 13,440 | 74,400 |
| Knoxville Iron Co. | ..... | ..... | 38,000 |
| Republic Steel Co. | 448,000 | 576,800 | 715,000 |
| Tennessee Coal, Iron & R. R. Co. | | | |
| Ensley | 1,075,200 | 1,075,200 | 1,568,000 |
| Fairfield | 922,880 | 922,880 | 1,092,000 |
| Total | 1,998,080 | 1,998,080 | 2,660,000 |
| TOTAL Southern District | 2,616,365 | 3,741,805 | 3,701,400 |
| **ST. LOUIS** | | | |
| American Rolling Mill Co. | | | |
| Scullin | 228,614 | 268,934 | ..... |
| Sheffield | 260,288 | 340,928 | 428,000 |
| Total | 488,902 | 609,862 | 428,000 |
| Granite City Steel Co. | 403,200 | 403,200 | 703,200 |
| Keystone Steel & Wire Co. | 264,580 | 264,580 | 302,400 |
| Laclede Steel Co. | 278,840 | 278,840 | 326,020 |
| TOTAL St. Louis District | 1,435,522 | 1,556,482 | 1,757,620 |

| DISTRICT—COMPANY | Rated Annual Capacity—Net Tons 1936 | 1938 | 1945 |
|---|---|---|---|
| **EASTERN** | | | |
| Allegheny Ludlum Steel Co. | 25,760 | 28,000 | 25,000 |
| American Steel & Wire Co. | 212,800 | 212,800 | 280,000 |
| Crucible Steel Co. of America | | | |
| Harrison | 34,384 | 34,280 | 210,000 |
| Syracuse | 16,800 | 15,600 | 24,000 |
| Halcomb | 49,168 | 44,800 | 54,000 |
| Total | 100,352 | 94,680 | 288,000 |
| Stanley Works | 134,400 | 162,175 | 188,200 |
| Washburn Wire Co. | 57,120 | 67,200 | 60,000 |
| Wickwire Brothers Inc. | 47,040 | 47,040 | 38,000 |
| TOTAL Eastern District | 577,472 | 611,895 | 879,200 |
| **WESTERN** | | | |
| American Rolling Mill Co. | | | |
| Sands Springs | 56,000 | 56,000 | 54,000 |
| Houston | ..... | ..... | 466,000 |
| Total | 56,000 | 56,000 | 520,000 |
| Bethlehem Steel Co. | | | |
| Los Angeles | 95,200 | 95,200 | 117,000 |
| San Francisco | 173,600 | 173,600 | 235,000 |
| Seattle | 156,800 | 156,800 | 210,000 |
| Total | 425,600 | 425,600 | 562,000 |
| Cabot Shops, Inc. | ..... | ..... | 12,000 |
| Colorado Fuel & Iron Co. | 991,245 | 1,105,440 | 1,272,000 |
| Columbia Steel Co. | | | |
| Pittsburg | 263,648 | 263,200 | 416,600 |
| Torrance | 196,000 | 196,000 | 211,000 |
| Total | 459,648 | 459,200 | 627,600 |
| Courtney & Co. | ..... | 67 | 750,000 |
| Geneva Steel Co. | ..... | ..... | 1,283,400 |
| Hinderliter Tool Co. | ..... | ..... | 9,450 |
| Isaacson Iron Works | ..... | ..... | 104,400 |
| Judson Steel Corp. | 71,971 | 71,971 | 76,530 |
| Kaiser Co., Inc. | ..... | ..... | ..... |
| National Supply Co. | 8,400 | 8,400 | 45,900 |
| Northwest Steel Rolling Mills | 16,800 | 16,800 | 32,400 |
| Oregon Steel Mills | ..... | ..... | 60,000 |
| Pacific States Steel Corp. | ..... | ..... | 88,820 |
| Texas Steel Corp. | 4,256 | 3,228 | 22,320 |
| TOTAL Western District | 2,033,920 | 2,146,704 | 5,496,790 |
| **DETROIT** | | | |
| Allegheny Ludlum Co. | ..... | ..... | 3,000 |
| Ford Motor Co. | 694,800 | 973,123 | 987,420 |
| Great Lakes Steel Corp. | 1,545,600 | 2,195,200 | 2,050,000 |
| Rotary Electric Steel Corp. | 84,000 | 144,648 | 170,000 |
| TOTAL Detroit District | 2,234,400 | 3,312,971 | 3,190,420 |
| **SOUTH OHIO RIVER** | | | |
| American Rolling Mill Co. | | | |
| Ashland | 619,808 | 739,200 | 783,000 |
| Middletown | 815,360 | 918,400 | 948,000 |
| Total | 1,435,168 | 1,657,600 | 1,731,000 |
| Andrews Steel Co. | 384,160 | 358,400 | 413,100 |
| Wheeling Steel Corp. | 560,000 | 616,000 | 616,000 |
| TOTAL South Ohio District | 2,379,328 | 2,632,000 | 2,760,100 |

# Symington Considers Private Magnesium Plants Adequate for Postwar

***Washington***

• • • The three privately-owned magnesium producers with a rated annual capacity of 30,000 tons were estimated by W. Stuart Symington, Surplus Property Administrator, in the fifth report to Congress recommending disposal plans for warbuilt industries, to be adequate to handle expected magnesium consumption during the next few years.

The report recommended that the 13 government-owned plants containing 90 pct of wartime productive capacity should be taken out of production or held in partial production and standby condition.

The report pointed out that the war-expanded capacity to produce magnesium is 10 times as much as most estimates of annual peacetime consumption, and added that the government owns magnesium metal and scrap equal to about two years normal consumption.

Specifically, SPA recommends that seven plants which cost the government roughly $264 million be taken out of magnesium production and adapted to other uses. The rated capactiy of these seven plants is 166,000 tons of metal. These plants are the least desirable due to their high costs of operation, location, size, etc. Metal has been produced in them at costs ranging from 18.7¢ to 73.3¢ a lb. This compares with 12¢ a lb in privately-owned plants.

The seven government-owned plants which the report states should be sold or leased for purposes other than magnesium production, or which should be dismantled or converted into warehouse space, if no buyers are found, are:

Basic Magnesium at Las Vegas and Gabbs, Nev., cost $132,700,000.

Dow plant at Ludington and Marysville, Mich., $39,900,000.

International plant at Austin, Tex., $18,800,000.

Permanente plant at Manteca, Calif., $6,200,000.

Amco plant at Wingdale, N. Y., $7,100,000.

Ford Motor Co. magnesium plant at Dearborn, Mich., $10,500,000.

Mathieson plant at Lake Charles, La., $48,800,000.

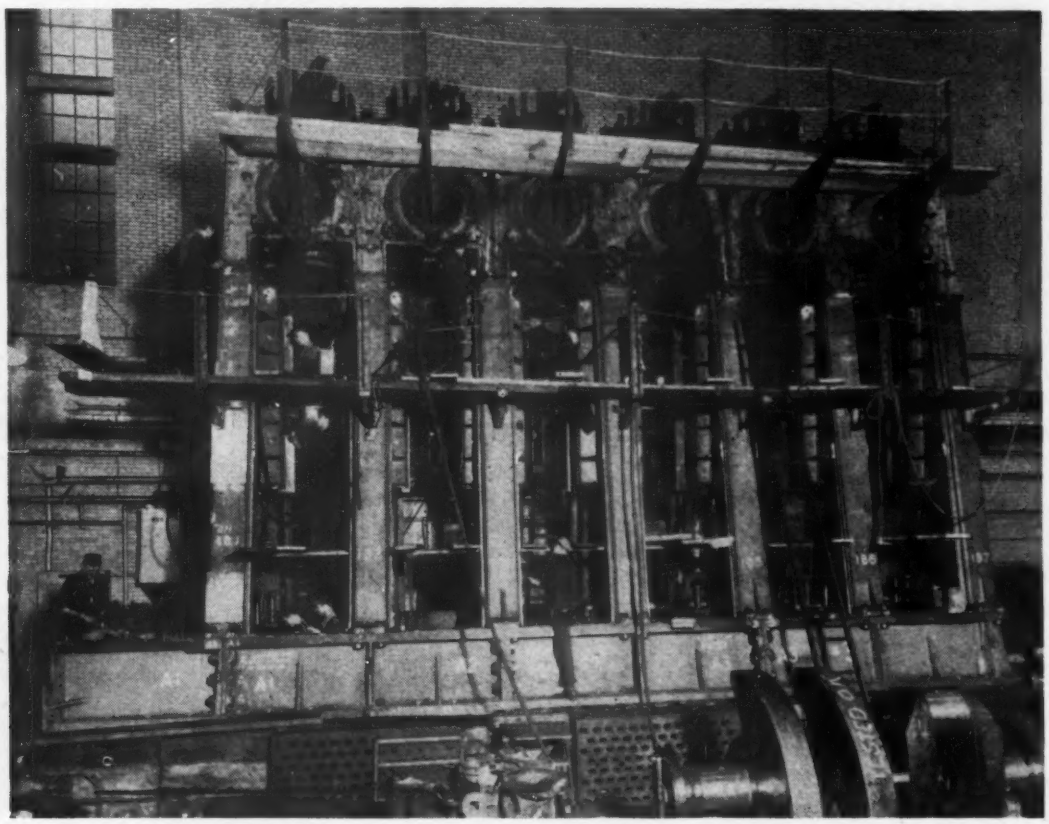
The report states that requirements for the national defense make it desirable to keep at least one-third of the government-owned capacity available for producing metal, either in operation or standby condition, even though there is little likelihood that the immediate market will absorb more than a minor part of the capacity of those plants. In line with this finding, the report recommends that the six government plants considered more economical of operation, or so located as to have strategic value, be leased or sold on condition that they be kept available for magnesium production even though they engage in the production of other materials.

These plants have a total rated capacity of 97,000 tons, which, combined with the 30,000 tons capacity of the three privately-owned plants, could produce 127,000 tons. The plants to be held in production, partial production, or standby are:

Dow Chemical at Freeport, Tex., which cost $8,200,000.

Dow Magnesium at Velasco, Tex., $56,600,000.

Diamond Magnesium at Painesville, Ohio, $14,800,000.



o o o

**REBUILT ENGINE:** ***The Bethlehem Steel Co. shipyard, Staten Island, N. Y., has just finished rebuilding this*** 200-***ton Krupp diesel motor. The*** 6-***cylinder engine was removed section by section from the Panamanian tanker*** M. S. Peter Hurll, ***repaired, disassembled and then replaced in the ship.***

o o o

Magnesium Reduction plant at Luckey, Ohio, $4,800,000.

Electrometallurgical plant at Spokane, Wash., $16,100,000.

New England Lime Co. plant at Canaan, Conn., $4,900,000.

The Freeport and Velasco, Tex., plants are the two in which production costs are lowest. Both have been operated by the Dow Chemical Co., which was the only producer of magnesium before the war. The combined production capacity of these two Texas plants and the privately-owned plants would be far in excess of the most optimistic estimates of postwar consumption of magnesium, the report states. There is, therefore, very little incentive to operate any of the other four plants, the document concludes, unless some limitation is placed upon production of magnesium by the two Texas plants. Dow has certain prior rights to acquire the Freeport and Velasco plants under its contract with the government.

As against a large investment in metal producing plants, which totals almost $370 million, the government investment in plants and equipment to convert magnesium metal into commercially useful forms, such as castings, forgings, extrusions, etc., amounts to slighly more than $31 million spread among 11 government-owned plants and 14 privately-owned plants in which government equipment is located. These fabricating plants are smaller than the metal producers, only two costing more than $5 million.

Even though the government's investment in fabricating plants is less than 10 pct of its expenditures for metal plants, the report urges that intelligent disposal of such smaller facilities should be directed to encourage the continued operation in magnesium and the development of markets for the metal. This may do more to increase the use of magnesium than the program for disposal of the metal plants.

The report therefore urges that the fabricating facilities should be turned over to independent operators even on terms giving the government a very low return on its investment. The report states that these plants employ from five to ten times as many workers per lb of output as do metal plants and they are of such size as to interest smaller businesses.

## Army Agrees to Release Standby Plants to Foster Civilian Production

*Washington*

• • • Representing an investment of approximately $1,781 million, the War Dept. has announced an additional list of 194 surplus government-owned warplants which are being disposed of through RFC. This group supplements the 252 which were listed Aug. 23 as shortly available for disposal. All except 15 of this latter total now have been determined as surplus to War Dept. needs and six of these are scheduled to be declared early in 1946. Plans for the other nine plants remain indefinite. With these 437, the War Dept. has released more than 70 pct of the government-owned plants according to Brig. Gen. David N. Hauserman, director of the Readjustment Div.

Plants scheduled for retention in standby will, if possible, be made available for lease to private industries for civilian production, it was announced. If some are desired for purchase by commercial enterprises, the War Dept. will cooperate so far as possible in releasing these plants and retaining others, now listed for surplus, in their place.

The 10 largest plants declared surplus in the latest list, represent an estimated cost of $652 million. Among them are Ford Motor Co., Willow Run, Mich.; Basic Magnesium, Inc., Las Vegas, Nev.; Denver Ordnance Plant, Denver; Weldon Spring Ordnance Works, Weldon Spring, Mo.; Packard Motor Co., Detroit; General Motors Corp., Melrose Park, Ill.; Dow Magnesium Corp., Velasco, Tex., and Marysville, Mich.

Other plants for disposal are Adirondack Foundries & Steel, Inc., Watervliet, N. Y.; American Steel Foundries, East Chicago, Ind.; Anaconda Wire & Cable Co., Marion, Ind.; and Sycamore, Ill.; W. F. & John Barnes Co., Rockford, Ill.; Bethlehem Steel Co., near Johnstown, Pa.; Harrisburg Steel Corp., Harrisburg, Pa.; Lehigh Foundries, Easton, Pa.; Ohio Steel Foundry, Lima, Ohio; Ridgewood Steel Co., Cincinnati; Zimmerman Steel Foundry, Bettendorf, Iowa; Aetna Ball Bearing Mfg. Co., Chicago; Allis Chalmers Mfg. Co., West Allis, Wis.; Aluminum Forgings Co., Inc., Erie, Pa.; Amco Magnesium Co., Wingdale, N. Y.; Bendix Aviation Corp., 13 plants; Bohn Aluminum & Brass Corp., Adrian, Mich. and Los Angeles; Curtiss-Wright Corp., five plants; Electro Metallurgical Co., Spokane, Wash.; General Electric Co., six plants; General Motors Corp., five plants; Jack & Heintz, Inc., two plants, Bedford, Ohio; Michigan Tool Co., Detroit; Ohio Crankshaft Co., two plants, Cleveland; Permanente Metals Corp., Manteca, Calif.; Precision Castings Co., Inc., Fayetteville, N. Y.; Pullman Standard Car Mfg. Co., Chicago; Reynolds Alloys Co., Sheffield, Ala.; Reynolds Metals Co., Louisville, Ky.; and Memphis, Tenn.; A. O. Smith Corp., St. Paul, Minn.; Transue-Williams Steel Forging Corp., Alliance, Ohio; Kropp Forge & Aviation Co., Cicero, Ill.; Ladish Drop Forge Co., Cudahy, Wis.

## OPA Acts On Sale Of Terminated Left Overs

*Washington*

• • • OPA has announced that sales of commodities left over after the termination of war contracts can be made at acquisition cost by the government or by contractors on behalf of the government only when prospective buyers have been given notice of such acquisition cost. This action, effective Dec. 3, puts use of the most common method of pricing war contract termination inventories on a conditional basis, whereas previously it could be used without restriction.

The modification has been made, OPA said, because many buyers were bidding only up to the limits provided by the other optional method of pricing (use of the existing maximum prices for the particular commodities being sold) not knowing of the acquisition cost method, which frequently provides higher ceilings.

At the same time, OPA made it clear that under one optional method of establishing ceiling prices on war surplus goods generally, namely, by a certification of the buyer that the price paid is not in excess of the ceilings normally applicable on his purchases, no price may be certified on surplus new lumber that is above recently established dollar-and-cent ceilings for such lumber.

# Loading Practice for Air Cargo Seen Important Time and Cost Factor

*Chicago*

• • • **Lack of standardization** remains the principal stumbling block to efficient air cargo handling, speakers before the SAE National Air Transport Engineering Meeting said here last week.

Loading of the airplane has received more attention than any other phase of the overall cargo handling picture because it represents the greatest time factor, M. B. Crawford, chief equipment engineer, United Airlines said.

"United Airlines started experimenting with the belt loader four years ago and has encountered and solved a number of problems involved in its use," Mr. Crawford declared. "However, there were a number of angles which did not seem to fit into the present cargo handling picture, and for the time being, we have discarded the use of the belt loader in its present form in favor of the fork lift," necessity of an additional handler, limitation to small packages, necessity for a frequently inconvenient electric cord, and difficulties of wintertime use, led to its temporary abandonment.

Mr. Crawford revealed that United now is working on a combination truck and belt loader which, he felt, had "tremendous possibilities." The truck body is the standard walk-in-cab-over-engine type of the three-ton variety. A working platform is provided on the roof of the truck which is of satisfactory height to accommodate the DC-3 as well as DC-6. Access ladders are provided on either side of the truck to reach the platform. The belt loader is located on the right hand side of the truck. The belt is operated by hydraulic motor which drives the belt in speeds ranging from 0 to 75 fpm. Power for the motor is supplied from a hydraulic pump installed on the truck engine. The door in the roof of the truck is operated with hydraulic cylinder and the belt can be extended above the truck to any desired height, also with the hydraulic cylinder.

"This arrangement provides plenty of room for the off-and-on cargo inside the truck body, and will not only keep the cargo in out of the weather, but provides a comfortable space for the cargo handler to work. This arrangement eliminates all the objections to the present belt loader and it can be moved off the ramp when not in use," Mr. Crawford said.

He also pointed out that a fork lift could be used in conjunction to lift a pallet or tub directly to the platform for handling. Also, when alternate fields were used, the truck could be used to transfer the cargo to the scheduled field.

The speaker praised the Boeing C-97 as "one of the outstanding examples of constructive thinking in air cargo airplanes." On this plane an electric hoist and monorail system is part of the airplane and is used for handling the cargo inside the main cabin and out into the ground carrier. The constellation, C-54, and DC-6 came in for criticism over the difficulty of loading cargo pits. The airlines have joined in the development of preloaded containers designed to fill entirely available space in the DC-6 pit. Each container travels to its place on a monorail.

The preloaded container for the DC-6 belly pit will be constructed of lightweight material with sides of expanded metal or transparent material allowing visual examination. The airlines are currently seeking a manufacturer for these containers, it was stated.

Lt. Col. David W. Long, the Air Transport Command, characterized air cargo loading, packaging, and handling problems sufficiently serious to require the services of a cooperative research organization which, serving all lines, would develop standardized loading equipment and smooth, fast, economical handling practices. He asserted that during the war the Air Transport Command found uniformity of such operation to be the key to efficiency.

Cargo handling equipment should be installed at airports, not carried around in planes to reduce pay loads, said Col. Long. He recommended that standard methods of cargo tie-down be developed and much more attention be given to proper packaging. He said the Air Transport Command had found repacking effective, better than one-third of the 3 million lb. of air freight passing in one month through the Port of Miami being safe.

Bernard L. Messinger, Lockheed Aircraft Corp., described refrigeration equipment for air conditioning the Lockheed Constellation. He concluded that the air turbine refrigeration cycle is the simplest, lightest and most compact for the purpose of air conditioning pressurized transport airplanes, due in part to primary compressors being included as elements of the cabin supercharging equipment.

The 1944 Manly Memorial Medal of the SAE was awarded to Kenneth Campbell, Wright Aeronautical Corp., Paterson, N. J., at the banquet session. Basis for the award was Mr. Campbell's paper, "Engine Cooling Fan Theory and Practice." Adjudged the best treatise relating to aeronautical powerplant development presented before an SAE meeting during 1944. This paper, which also won for Mr. Campbell the SAE Wright Brothers Medal for 1944, awarded last April at the SAE Metropolitan Section Aeronautic Meeting in New York, compiled and explained the results of exhaustive studies of the design and engineering requirements of fans used to cool aircraft powerplants.

## ASA Elects Officers

*New York*

• • • **Henry B. Bryans, executive vice-president and director of the Philadelphia Electric Co., was unanimously reelected to serve a third term as president of the American Standards Assn. Frederick R. Lack, vice-president and manager of the Radio Div., Western Electric Co., Inc., was elected vice-president. Other officers of the association announced at the annual meeting, held at the Hotel Biltmore, New York, are E. C. Crittenden, assistant director of the National Bureau of Standards, as chairman of the Standards Council, and L. F. Adams, General Electric Co., as vice-chairman of the Standards Council.**

## Proposed Rivet Standards

*Washington*

• • • **The Division of Simplified Practice, National Bureau of Standards, has submitted a proposed recommendation for steel rivets to producers, distributors and users for consideration. It contemplates the establishment of a voluntary simplified list of stock production sizes (lengths and diameters) for small rivets having round head, flat head, truss or wagon box head and countersunk head, and also for belt rivets, tinners and coppers rivets, and large rivets with button head.**

## Cites Impact of War On Science in Peace

*New York*

• • • Dr. Lyman J. Briggs, guest speaker at the annual meeting of the American Standards Assn., held here recently, reversed the usual procedure of explaining science's contribution to war and brilliantly proved the impetus of war on science.

Mr. Henry B. Bryans, reelected for a third term as president of the American Standards Assn. told the assembled executives of trade, technical, and governmental groups that "These are the times that try men's souls" and that the American Standards Assn., with its democratic procedures, is ready to prove that individual enterprise as confidently championed by business, labor, and government spokesmen can produce superior results.

Dr. H. S. Osborne, chief engineer of the American Telephone and Telegraph Co., pointed out in his report as retiring chairman of the ASA standards council that 85 pct of the standards adopted by the ASA in the past year were directly concerned with the war effort. He pointed out that the ASA will continue to increase in helpfulness to industry and Government and will be able to more effectively meet its important and growing responsibilities for the coming years because of its experience during the prewar years.

## More Rubber in Belting

*Washington*

• • • Plans are under consideration to increase the production of conveyor belting, a reconversion bottleneck, by permitting the use of more natural rubber in this important industrial product, CPA has announced. At present, the permitted use is only 5 pct of natural rubber in conveyor belting.

It is indicated that some manufacturers might increase their conveyor belt production by 10 pct to 50 pct in approximately 30 days through the use of no more than 25 pct natural rubber, CPA's Rubber Div. officials reported. Provided that production is increased by this method, it is expected that the Rubber order (R-1) will be amended shortly permitting this additional use of natural rubber on a permanent basis.

# Industrial Briefs . . .

• SERVICEMEN RETURN—Ninety pct of Pullman Co. employees who have returned to civilian status after service in the armed forces have resumed their work with the sleeping car company. Of the 1189 Pullman servicemen and women already discharged, 1070 have rejoined the company.

• LEASES TVA LAND — Reynolds Metals Co. has announced that arrangements have been completed for immediate occupancy by Reynolds of the property at Sheffield, Ala., known as Nitrate Plant No. 1. Reynolds Metals has leased the property from the Tennessee Valley Authority for a 10-yr period with a purchase option. It will be used for production of building products and will employ 300 to 500 at the start of production. The property consists of 10 buildings, an office building and 65 acres of land.

• ADVERTISING AGENT — The Eaton Mfg. Co. of Cleveland, manufacturers of precision parts for the automotive and aviation industries, has named Florez, Phillips & Clark, of Detroit, as its advertising agency, effective Jan. 1.

• TO REPRESENT—Stanley Berg & Co., Pittsburgh, have been appointed as representatives of Lehmann Machine Co., St. Louis. Mr. Berg will make his headquarters in the Pittsburgh office, and also maintain his offices at Washington, D. C.

• OFFICE BUILDING — Snap-On Tools Corp., Kenosha, Wis., has broken ground for a new $100,000 office building, the first project in its postwar planning program.

• FACTORY BUILDING — Cleveland Steel Products Co. is planning to build a $1,000,000 factory and office building, with facilities for employing about 600 workers. Construction is scheduled to start in February.

• BUYS INTEREST—Purchase of controlling stock interest in Bingham Stamping Co. by William J. Mericka & Co., Cleveland, and Goshia & Co., Toledo, was announced recently. The present management, headed by Louis E. Yunker, president and general manager, will be retained.

• SOUTHERN OFFICE—Baldwin Locomotive Works has opened a southern district sales office at 829 Frank Nelson Bldg., Birmingham. J. A. Stearns is manager.

• ACQUISITION—The Non-Ferrous Metal Co. has acquired the physical assets of Bell Bro., Pittsburgh, Pa. The new company will produce brass and bronze ingots for the foundry trade. Frank A. Zontine, long associated with Bell Bro., will carry on with the new company as its secretary.

• NEW STEEL CO.—Southwestern Ohio Steel Co., Inc., Hamilton, Ohio, has been organized to fabricate steel for sale to industrial plants in that area. Officers are: President, William J. Wolf; vice-president, Frank H. Wulftange; secretary-treasurer, Freda E. Jennewein.

• BUYS DIE FIRM—R. H. Osbrink Mfg. Co., Los Angeles, has recently purchased Aacco, Inc., Los Angeles, a die-casting company, which will operate as a division of Osbrink.

• MCCULLOCH MOVES—The McCulloch Aviation Co., Milwaukee, is moving to Los Angeles, where a new $750,000 factory building is being erected. About 35 key men and much of the machinery at the Milwaukee plant will move to the Los Angeles operation.

• CHANGES NAME—Pittsburgh Equitable Meter Co. has changed its name to Rockwell Mfg. Co.

# MACHINE TOOLS

**. . . News and Market Activities**

## Tool Up-Turn Expected Next Spring

***Cleveland***

• • • **The up-turn in machine tool sales, to permit full postwar production, will not take place at least until next spring.**

Conditions holding back this essential step in industry's reconversion to peacetime output were disclosed in a survey conducted among 60 field representatives gathered here from all sections of the United States recently for the annual sales meeting of the Warner & Swasey Co.

With surprisingly little variation, the sale of new machine tools over the entire country during the first quarter of 1946 is expected to remain at about the same level as it has during the past three months.

Increased purchases in Philadelphia will be completely offset by reduced orders in the Pittsburgh and Cleveland area.

There is, however, a rising trend—as definite in West Coast industry and throughout the South as it is from Detroit eastward — toward replacement of present obsolete equipment with new types of machine tools now being introduced.

Strikes and demands for higher wages, coupled with the ceiling on prices, are holding back the signing of actual orders for such new equipment by West Coast, New England and East Coast manufacturers, pending clarification of the Labor-OPA situation.

This stalemate is particularly distinct in Detroit, whereas manufacturers in Buffalo, Toronto, Philadelphia, Pittsburgh, Cleveland, Detroit, Chicago and Milwaukee are in a state of indecision on these points.

Those in the southern industrial areas as yet express little fear of strikes. The pressure there for higher wages is acting as a deterrent, particularly in larger plants, but price ceilings are less of a problem.

According to this Warner & Swasey survey, the acquisition of government surplus machine tools shows up as a stop-gap measure in a degree corresponding to the above reactions on the labor OPA situation.

About 60 to 70 pct of machine tools purchased in industries of the East and West Coasts, and around Detroit, fall in this category.

The South is splitting its orders between surplus equipment and tools of new design, while midwestern manufacturers and those in the "industrial 'triangle' range" downward to a narrow margin of acceptance for government surplus.

Throughout the country, the low price and early delivery of machines from government inventories are the major factors of consideration, although equipment thus far acquired from this source has proved satisfactory as a means of speeding reconversion beyond question only in a few stabilized industries where the reconversion problem is minor.

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## Reports Reduced Demand

*Cincinnati*

• • • **Some slowing in machine tool demand is noted by district manufacturers. The immediate cause is believed to be labor difficulties in various industries bringing about such uncertainty as to cause buyer hesitancy. Despite the present easing demand, district builders indicate that a fair volume of business continues with foreign demand steady. Lathes, drills and lighter tools are most active and reports indicate purchases of these types have been heavier this year than the larger tools. Production continues at good pace with backlogs being reduced rapidly. No labor difficulties have appeared in the local machine tool market but strikes in allied lines continue to slow up the receipt of many components.**

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## New Officers Elected

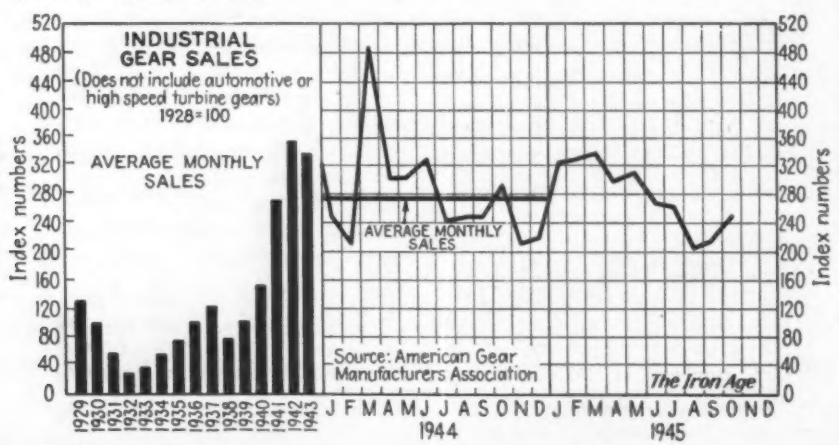
*Cleveland*

• • • **The following officers were elected for the ensuing year at the annual meeting of the American Machine Tool Distributors Assn.: President, A. B. Einig, Motch & Merryweather Machinery Co., Cleveland; vice-president, George Habicht, Jr., Marshall & Huschart Machinery Co., Chicago; second vice-president, D. N. Macconel, Machinery Sales Co., Los Angeles; secretary-treasurer, C. C. Brogan, W. E. Shipley Machinery Co., Philadelphia.**

**Members of the executive committee to serve until 1948 are: Howard G. Mook, Vandyck Churchill Co., New York; A. R. Williams, A. R. Williams Machinery Co., Toronto, Canada; and Omar S. Hunt, Marshall Huschart Machinery Co. of Indiana, Indianapolis.**

## OCTOBER GEAR SALES INCREASE

**. . . The gearing industry, as represented by the members of the American Gear Manufacturers Assn., shows an increase in volume of sales for October, as compared with September, of 18 pct. This report does not include turbine or propulsion gearing. The index figure for October was 251.**



# NONFERROUS METALS

. . . News and Market Activities

## Mercury Future Seen In Tropical Battery

*New York*

• • • **Developments in 1944** have caused a marked change in the outlook for mercury, according to the 1944 **Minerals Yearbook** preprint.

The question as to what place the new dry-cell battery, which employs mercury, will have in the future is so important that its answer should indicate whether or not postwar consumption levels will be similar to or higher than they were in the prewar period.

Beginning in 1945, for example, the war needs for the new battery are expected to take much more mercury than all other uses combined. The battery's proponents anticipate that it will have large industrial application after the war, and some of the suggested uses are hearing aids, fire-alarm equipment, and portable radio sets. Considerable research probably will be required before the battery can be assured of a substantial market, and the pressure for speed in supplying war demands has interfered with carrying on adequate research work.

Other uses for mercury are expected to follow the pattern outlined briefly in the chapter of this series for 1943. How much of the total postwar consumption, which should be at prewar or higher levels, will be supplied by domestic mines will depend largely on price, and the price will be determined, in part, by the government's attitude on the continuation of the tariff on mercury. With a large postwar demand and the protection of the tariff of $19 per flask, it is probable that most of the present larger domestic producers would aid in supplying requirements for mercury after the war. A sharp decline in prices, such as followed World War I, however, would close all but a very few domestic mines.

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## Aluminum in 800 lb Cars

*Paris*

• • • **Aluminum castings** will be widely used in the national car designed by J. A. Gregoire, which has been designated by the French Government for wide-scale production as a part of the five year plan for auto production. Use of light metal castings for main structural members of the auto will be the most important innovation in the design.

The designer hopes that taking advantage of the full strength of modern aluminum alloys will make it possible to sell the car at a lower price than any other standard passenger vehicle. Its design weight is only 800 lb. and is to carry four persons up to 60 mph. Fuel consumption is reported to be very low.

Patent rights are reported to have been acquired in England for the manufacture of the car there, also. The names of Renfrew Foundries Ltd., and Rolls Royce Ltd. are mentioned.

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## War Surplus Scrap Sales

*London*

• • • **Disposal of 51,000** metric tons of nonferrous war surplus scrap was reported recently in Parliament, for the period including the first nine months of this year. According to the parliamentary secretary to the Minister of Supply and Aircraft Production, war surpluses in these materials are being sold if possible as manufactured goods or in semi-finished form, and if not are remelted for scrap.

## Stymie Brass Mill Products Price Raise

*New York*

• • • **With labor votes** at Chase Brass and Scoville Mfg. Co. calling for strikes in those plants it is significant that there is a move afoot in the industry for an increase in the price of certain brass mill products on which OPA reports that there will be no action until after the first of the year, in accordance with similar action taken in the steel industry.

In this way the government agency forewarned the members of the Brass Mill Advisory Committee meeting in New York last week that there was little likelihood of a price increase for these products during December.

Meanwhile the demand for copper and brass mill products continues insistent and consumers are finding it increasingly difficult to place orders for early delivery. With further development of the strike there is no doubt that the supply situation will be further aggravated even with slackening of orders caused by strikes in consuming industries.

•

## Billiton Facilities Good

*London*

• • • **Not much damage** has been done to tin production facilities in the Dutch East Indies island of Billiton, according to a report in *The Metal Bulletin*. Although damage was slight to the installations, considerable machinery is said to have been carried off by the Japanese. Assessments of the loss have been made, and claims for its return have been made to Allied authorities in the Far East.

No less than 70 technicians are ready to leave for the Indies to aid in the rehabilitation of the industry, and future progress on Billiton Island is said to await their arrival. It is thought that even if the machinery is located and returned intact that it will be six months thereafter before tin can be produced.

In the meantime, complaints are being voiced in Britain that reports from Allied authorities on the present state of the tin and rubber producing areas are being unnecessarily held up by military authorities.

## Sweden's Copper, Nickel Manganese Output Up

*New York*

• • • **According to official Swedish** government statistics, production of nonferrous metals in Sweden in metric tons during the early war years was as follows:

| Year | Copper | Nickel | Manganese | Zinc | Gold | Silver |
|---|---|---|---|---|---|---|
| Yearly average for 1936 to 1940... | 12,498 | .... | 5850 | 63,463 | 254,655 | 14,587 |
| 1939..... | 16,434 | .... | 6085 | 63,826 | 242,280 | 14,195 |
| 1940..... | 17,784 | .... | 4600 | 55,123 | 229,291 | 15,055 |
| 1941..... | 33,319 | 4991 | 13,928 | 61,381 | 188,448 | 15,828 |

## Primary Metals

*(Cents per lb, unless otherwise noted)*

| | |
|---|---|
| Aluminum, 99+%, del'd (Min. 10,000 lb) | 15.00 |
| Aluminum pig | 14.00 |
| Antimony, American, Laredo, Tex. | 14.50 |
| Beryllium copper, 3.75-4.25% Be; dollars, per lb. contained Be | $17.00 |
| Cadmium, del'd | 90.00 |
| Cobalt, 97-99% (per lb) | $1.50 to $1.57 |
| Copper, electro, Conn. valley | 12.00 |
| Copper, electro, New York | 11.75 |
| Copper, lake | 12.00 |
| Gold, U. S. Treas., dollars per oz. | $35.00 |
| Indium, 99.8%, dollars per troy oz. | $ 2.25 |
| Iridium, dollars per troy oz. | $90-$100 |
| Lead, St. Louis | 6.35 |
| Lead, New York | 6.50 |
| Magnesium, 99.9 + %, carlots | 20.50 |
| Magnesium, 12-in. sticks, carlots | 27.50 |
| Mercury, dollars per 76-lb flask, f.o.b. New York | $107 to $110 |
| Nickel, electro | 35.00 |
| Palladium, dollars per troy oz. | $24.00 |
| Platinum, dollars per oz. | $35.00 |
| Silver, New York, cents per oz. | 71.11 |
| Tin, Straits, New York | 52.00 |
| Zinc, East St. Louis | 8.25 |
| Zinc, New York | 8.65 |

## Remelted Metals

*(Cents per lb unless otherwise noted)*

| | |
|---|---|
| Aluminum, No. 12 Fdy. (No. 2) | 9.00 to 10.00 |
| Aluminum, deoxidizing No. 2, 3, 4 | $6.00 to 9.50 |
| Brass ingot | |
| 85-5-5-5 (No. 115) | 13.25 |
| 88-10-2 (No. 215) | 16.75 |
| 80-10-10 (No. 305) | 16.00 |
| No. 1 Yellow (No. 405) | 10.25 |

## Copper, Copper Base Alloys

*(Mill base, cents per lb)*

| | Extruded Shapes | Rods | Sheets |
|---|---|---|---|
| Copper | 20.87 | .. | 20.37 |
| Copper, H.R. | .... | 17.37 | .... |
| Copper drawn | .... | 18.37 | .... |
| Low brass, 80% | .... | 20.40 | 20.15 |
| High brass | .... | .. | 19.42 |
| Red brass, 85% | .... | 20.41 | 20.36 |
| Naval brass | 20.37 | 19.12 | 24.50 |
| Brass, free cut | .... | 15.01 | .... |
| Commercial bronze, 90% | .... | 21.32 | 21.07 |
| Commercial bronze, 95% | .... | 21.53 | 21.28 |
| Manganese bronze | 24.00 | .... | 28.00 |
| Phos. bronze, A, B, 5% | .... | 26.50 | 26.25 |
| Muntz metal | 20.12 | 18.87 | 22.75 |
| Everdur, Herculoy, Olympic or equal | .... | 25.50 | 26.00 |
| Nickel silver, 5% | .... | 28.75 | 26.50 |
| Architect bronze | 19.12 | .... | .... |

## Aluminum

*(Cents per lb., subject to extras on page, size, temper, finish, factor number, etc.)*

*Tubing:* 2 in. O.D. x 0.065 in. wall 2S, 40c. (½H); 52S, 61c. (O); 24S, 67½c.

*Plate:* 0.250 in. and heavier: 2S and 3S, 21.2c.; 52S, 24.2c.; 61S, 22.8c.; 24S, 24.2c.

*Flat Sheet:* 0.188 in. thickness: 2S and 3S, 22.7c. a lb.; 52S, 26.2c.; 61S, 24.7c.; 24S, 26.7c.

2000-lb. base for tubing; 30,000-lb. base for plate, flat stock.

*Extruded Shapes:* "As extruded" temper; 2000-lb. base, 2S and 3S, factor No. 1 to 4, 25.5c.; 14S, factor No. 1 to 4, 35c.; 17S, factor No. 1 to 4, 31c.; 24S, factor No. 1 to 4, 34c.; 53S, factor No. 1 to 4, 28c.; 61S, factor No. 1 to 4, 28½c.

The factor is determined by dividing perimeter of shape by weight per lineal foot.

*Wire Rod and Bar:* Base price; 17ST and 11ST-3, screw machine stock. Rounds: ¼ in., 28½c. per lb.; ½ in., 26c.; 1 in., 24½c.; 2 in., 23c. Hexagonals: ¼ in., 34½c. per lb.; ½ in., 28½c.; 1 in., 25½c.; 2 in., 25½c. 2S, as fabricated, random or standard lengths, ¼ in., 34c. per lb.; ½ in., 25c.; 1 in., 24c.; 2 in., 23c. 24ST, rectangles and squares, random or standard lengths, 0.093-0.187 in. thick by 1.001-2.000 in. wide, 32c. per lb.; 0.751-1.500 in. thick by 2.001-4.000 in. wide, 29c.; 1.501-2.000 in. thick by 4.001-6.000 in. wide, 27½c.

## Magnesium

Sheet, rod, tubes, bars, extruded shapes subject to individual quotations. Metal turnings: 100 lb. or more, 16c. a lb.; 25 to 90 lb., 56c.; less than 25 lb., 66c.

# NONFERROUS SCRAP METAL QUOTATIONS

*†(OPA basic maximum prices, cents per lb., f.o.b. point of shipment, subject to quality, quantity and special preparation premiums—other prices are current quotations)*

## Copper, Copper Base Alloys

### *OPA Group 1†*

| | |
|---|---|
| No. 1 wire, No. 1 heavy copper | 9.75 |
| No. 1 tinned copper wire, No. 1 tinned heavy copper | 9.75 |
| No. 2 wire, mixed heavy copper | 8.75 |
| Copper tuyeres | 8.75 |
| Light copper | 7.75 |
| Copper borings | 9.75 |
| No. 2 copper borings | 8.75 |
| Lead covered copper wire, cable | 6.00* |
| Lead covered telephone, power cable | 6.04 |
| Insulated copper | 5.10* |

### *OPA Group 2†*

| | |
|---|---|
| Bell metal | 15.50 |
| High grade bronze gears | 13.25 |
| High grade bronze solids | 11.50* |
| Low lead bronze borings | 11.50* |
| Babbitt lined brass bushings | 13.00 |
| High lead bronze solids | 10.00* |
| High lead bronze borings | 10.00* |
| Red trolley wheels | 10.75 |
| Tinny (phosphor bronze) borings | 10.50 |
| Tinny (phosphor bronze) solids | 10.50 |
| Copper-nickel solids and borings | 9.25 |
| Bronze paper mill wire cloth | 9.50 |
| Aluminum bronze solids | 9.00 |
| Soft red brass (No. 1 composition) | 9.00 |
| Soft red brass borings (No. 1) | 9.00 |
| Gilding metal turnings | 8.50 |
| Contaminated gilded metal solids | 8.00 |
| Unlined standard red car boxes | 8.25 |
| Lined standard red car boxes | 7.75 |
| Cocks and faucets | 7.75 |
| Mixed brass screens | 7.75 |
| Red brass breakage | 7.50 |
| Old nickel silver solids, borings | 6.25 |
| Copper lead solids, borings | 6.25 |
| Yellow brass castings | 6.00 |
| Automobile radiators | 7.25 |
| Zincy bronze borings | 7.00 |
| Zincy bronze solids | 8.00 |

### *OPA Group 3†*

| | |
|---|---|
| Fired rifle shells | 3.00 |
| Brass pipe | 7.25 |
| Old rolled brass | 6.75 |
| Admiralty condenser tubes | 7.25 |
| Muntz metal condenser tubes | 6.75 |
| Plated brass sheet, pipe reflectors | 6.25 |
| Manganese bronze solids | 7.00[1] |
| Manganese bronze solids | 6.00 |
| Manganese bronze borings | 6.25[1] |

### *OPA Group 4†*

| | |
|---|---|
| Refinery brass | 4.50* |

*Price varies with analysis. [1] Lead content 0.00 to 0.40 per cent. [2] Lead content 0.41 to 1.00 per cent.

## Other Copper Alloys

| | |
|---|---|
| Briquetted Cartridge Brass Turnings | 8.625 |
| Cartridge Brass Turnings, Loose | 7.875 |
| Loose Yellow Brass Trimmings | 7.875 |

## Aluminum*

### *Plant scrap, segregated*

| | |
|---|---|
| 2S solids | 8.00 |
| Dural alloys, solids 14, 17, 18, 24S | 4.00 |
| 25S turnings, dry basis | 3.00 |
| Low copper alloys 51, 52, 61, 63S solids | 7.25 |
| turnings, dry basis | 5.75 |

### *Plant scrap, mixed*

| | |
|---|---|
| Solids | 4.00 |
| Turnings, dry basis | 2.75 |

### *Obsolete scrap*

| | |
|---|---|
| Pure cable | 8.00 |
| Old sheet and utensils | 6.00 |
| Old castings and forgings | 5.00 |
| Pistons, free of struts | 6.00 |
| Pistons, with struts | 3.00 |
| Old alloy sheet | 5.00 |

## Magnesium*

### *Segregated plant scrap*

| | |
|---|---|
| Pure solids and all other solids, exempt | |
| Borings and turnings | 1.50 |

### *Mixed, contaminated plant scrap*

| | |
|---|---|
| Grade 1 solids | 3.00 |
| Grade 1 borings and turnings | 2.00 |
| Grade 2 solids | 2.00 |
| Grade 2 borings and turnings | 1.00 |

*Nominal.

## Zinc

| | |
|---|---|
| New zinc clippings, trimmings | 6.50 |
| Engravers, lithographers plates | 6.50 |
| Old zinc scrap | 4.75 |
| Unsweated zinc dross | 5.00 |
| Die cast slab | 4.50 |
| New die cast scrap | 4.45 |
| Radiator grilles, old and new | 3.50 |
| Old die cast scrap | 3.00 |

## Lead

Deduct 0.55c. a lb. from refined metal basing point prices or soft and hard lead including cable, for f.o.b. point of shipment price.

## Nickel

Ni content 98+%, Cu under ½%, 23¢ per lb.; 90 to 98% Ni, 22¢ per lb. contained Ni.

# ELECTROPLATING ANODES AND CHEMICALS

### *Anodes*

*(Cents per lb., f.o.b. shipping point in 500 lb. lots)*

| | |
|---|---|
| Copper, frt. allowed | |
| Cast, oval, 15 in. or longer | 25½ |
| Electrodeposited | 18½ |
| Rolled, oval, straight | 19½ |
| Curved | 20½ |
| Brass, 80-20, frt. allowed | |
| Cast, oval, 15 in. or longer | 23½ |
| Zinc, cast, 99.99, 15 in. or longer | 16½ |
| Nickel, 99 per cent plus, frt. allowed | |
| Cast | 47 |
| Rolled, depolarized | 48 |
| Silver, 999 fine | |
| Rolled, 100 oz. lots, per oz. | 80 |

### *Chemicals*

*(Cents per lb., f.o.b. shipping point)*

| | |
|---|---|
| Copper cyanide, 1-5 bbls. | 34.00 |
| Copper sulphate, 99.5, crystals, bbls. | 7.75 |
| Nickel salts, single, 425 lb. bbls., frt. allowed | 13.50 |
| Silver Cyanide, 100 oz. lots, per oz. | 0.6083 |
| Sodium cyanide, 96 per cent, domestic, 100 lb. drums | 15.00 |
| Zinc cyanide, 100 lb. drums | 33.00 |
| Zinc sulphate, 89 per cent, crystals, bbls., frt. allowed | 6.35 |

# SCRAP

. . . News and Market Activities

## Scrap Trade Eyes Freight Rate Drop

***Chicago***

• • • Establishment of a temporary freight rate of $12.32 per gross ton, effective Dec. 22, for movement of steel plate and structural steel scrap from the West Coast to Chicago may result in shipment of as much as 150,000 tons of shipyard termination scrap to midwestern mills.

The rate, which applies for a minimum loading of 100,000 lb per car, will be in effect for four months. The two larger local mills will probably be the principal immediate local beneficiaries by about 60,000 tons if satisfactory price terms can be worked out. Loading of some material has already started.

Dulien Steel Products, Inc., of Seattle, has a virtual corner on termination scrap sold to date, believed to amount to about 75,000 gross tons. The firm acquired 35,000 gross tons from Oregon Shipyards, Portland, about a month ago on a bid of $8.17 per gross ton. Other acquisitions are believed to range from $6.75 to $9.00 per gross ton, all unprepared material. The prices paid are about $3.00 below ceiling. Although shipyard plate scrap technically is classed as unprepared, in the past about 75 pct has been found of charging box size without further preparation.

Trade reports indicate that attempts are being made to secure a higher price for the material on the West Coast now that the freight rate change has become definite, and that local mills are balking. The owner is said to be talking of possibilities of holding the material for export or for Coast mills at the higher figure, but midwestern buyers are dubious that any considerable tonnage can be moved in this manner and are sticking to original offers.

Coast mills fought vigorously against the move for the lower freight rate which represents a cut of $2.46 per gross ton from the regular rate, contending that their reserve scrap sources would be depleted. Because mill buying prices at Los Angeles and Seattle range from $4.00 to $4.50 below ceiling, this plea has been subject to dispute, although it is acknowledged that shipment of any large tonnage to the Midwest probably will firm Coast markets. The Coast mills were successful in having the rate restricted to structural and plate scrap, thus preserving lower grade material, also available in quantity there, for their own use.

•

*PITTSBURGH* — Scrap demand continues at the same high level of the past few weeks while the supply is far short of needs. Mills are willing to pay greater springboards to bring the material in than at anytime since the ceiling on freight was removed, some going better than $1.50 on desirable tonnages. According to some sources, upgrading of scrap is prevalent but the mills are so anxious to get the material that not too much is said about the practice. Blast furnace scrap is practically non-existent, and the situation is as bad and probably worse than at anytime during the war. Mill operations are constantly threatened by scrap shortages, and with blast furnaces going bad at unpredictable and inconvenient times, it is difficult for mills to make any long range plans.

•

*CHICAGO*—Ceiling prices were bid for all items in the sale of approximately 13,000 tons of termination scrap at A. O. Smith Corp., Milwaukee, last week, with successful bidders for most items being decided by lot. The material comprised 6500 tons of long bomb bodies for which bids over unprepared ceiling were received; 2750 tons of bomb bodies 5 ft. and under, bringing bids as heavy melting steel; three lots totaling approximately 2625 tons classed as item 13 material; 550 tons classed as item 14; 175 tons as No. 2 heavy melting steel; and one lot of miscellaneous waste. All mill buying prices with the exception of alloys and some railroad specialties are firm at ceiling here with great interest centering in possibility of moving West Coast shipyard scrap here under the temporary rail rate reduction effective Dec. 22.

•

*BOSTON*—Shipments are at the lowest level since the depression following World War I, according to the trade. Weather and the lack of material, yard labor, freight cars and trucks are contributories. The Government has transferred 1700 tons unprepared scrap scheduled to unload here to Baltimore. Offsetting this are 2300 tons, mostly heavy melting steel offered by the local navy yard.

•

*NEW YORK*—The iron and steel scrap market in this area remains unchanged, with the market still very strong. Prices remain firm at ceiling, and demand continues to exceed supply. As a general rule, the strike threats are not greatly affecting market conditions and scrap movement is reported normal for this time of the year. Shipyard scrap volume has dropped off considerably, but termination scrap has helped to partially fill the gap.

•

*BUFFALO*—Contracts for over 20,000 tons of heavy melting steel and hydraulic bundles put out by principal consumers have assured maximum prices for openhearth material into 1946. Demand for rail specialties and low phosphorus scrap has eased off, however, with steel foundries and electric furnaces buying sparingly. Some dealers report that the bulk of yard receipts consists of termination scrap, which is moving in increasing volume. Arrival of two ships with 5000 tons each concluded the Lake season. The 1945 receipts from this source totaled over 200,000 tons which equaled the average for the war years.

•

*CLEVELAND*—Diminishing scrap supplies and a disproportionate demand have resulted in one of the tightest scrap situations in this area since the war. All grades continue to bring ceiling prices. Railroad specialties and electric furnace are showing some activity, and one major consumer reported picking up 30 cars of turnings; but, generally, market conditions have brought about an undue interest in termination inventory scrap which is going at high prices as a result. Brokers and dealers report competition from jobbers, manufacturers and other purchasers, who are buying anything they can from this source for usable steel.

•

*CINCINNATI* — Strength continues to characterize the district iron and steel scrap market and all types of material are moving. Bidding on railroad lists is still very active but the production scrap is not particularly desirable, since most of it is high chromium alloy and is not usable for steel or foundry use.

•

*BIRMINGHAM*—With several grades, including turnings and bar crops and plate, bringing higher prices in this area, ceiling prices are being obtained for practically all types of material. The market generally is very strong but supplies of blast furnace and cast grades are extremely scarce. The labor situation is spotty with some yards fairly well manned and others little short of being crippled.

•

*TORONTO*—The Canadian scrap iron and steel situation steadily is becoming more serious and there was further slowing in receipts during the week with renewed snowfalls throughout Eastern Canada. Collections from rural districts have been abandoned until next spring and only small movement of scrap is reported from outside points. Dealers are depending almost wholly on industrial plants for scrap supply and this is well down from the year's average. Steel mills and foundries are making every effort to obtain additional supplies of scrap but are meeting with small success. Stockpiles at consuming plants and in the hands of dealers are at the lowest tonnage in years.

Going prices as obtained in the trade by IRON AGE editors, based on representative tonnages. Where asterisks are used on quotations below, this indicates a ceiling price to which must be added brokerage fee and adjusted freight.

## PITTSBURGH

**Per gross ton delivered to consumer:**

| | |
|---|---|
| No. 1 hvy. melting | $20.00* |
| RR. hvy. melting | 21.00* |
| No. 2 hvy. melting | 20.00* |
| RR. scrap rails | 21.50* |
| Rails 3 ft. and under | 23.50* |
| No. 1 comp'd sheets | 20.00* |
| Hand bdld. new shts. | 20.00* |
| Hvy. axle turn. | 19.50* |
| Hvy. steel forge turn. | 19.50* |
| Mach. shop turn. | 15.00* |
| Short shov. turn. | 17.00* |
| Mixed bor. and turn. | 15.00* |
| Cast iron borings | 16.00* |
| Hvy. break cast. | 16.50* |
| No. 1 cupola | 20.00* |
| RR. knuck. and coup. | 24.50* |
| RR. coil springs | 24.50* |
| Rail leaf springs | 24.50* |
| Rolled steel wheels | 24.50* |
| Low phos. bil. crops | 25.00* |
| Low phos. | 22.50* |
| RR. malleable | 22.00* |

## CHICAGO

**Per gross ton delivered to consumer:**

| | |
|---|---|
| No. 1 hvy. melting | $18.75* |
| No. 2 hvy. melting | 18.75* |
| No. 1 bundles | 18.75* |
| No. 2 dealers' bndls. | 18.75* |
| Bundled mach. shop turn. | 18.75* |
| Galv. bundles | 16.75* |
| Mach. shop turn. | 13.75* |
| Short shovels, turn. | 15.75* |
| Cast iron borings | 14.75* |
| Mix. borings & turn. | 13.75* |
| Low phos. hvy. forge | 23.75* |
| Low phos. plates | 21.25* |
| No. 1 RR. hvy. melt. | 19.75* |
| Detroit rails | 22.25* |
| Miscellaneous rails | 20.25* |
| Rails 3 ft. and under | 22.25* |
| Locomotive tires, cut | $23.75 to 24.25 |
| Cut bolsters & side frames | 21.75 to 22.25 |
| Angles & splice bars | 22.25* |
| Standard stl. car axles | 24.25 to 24.75 |
| No. 3 steel wheels | 23.25* |
| Couplers & knuckles | 23.25* |
| Agricul. malleable | 22.00* |
| RR. malleable | 22.00* |
| No. 1 mach. cast. | 20.00* |
| No. 1 agricul. cast. | 20.00* |
| Hvy. breakable cast. | 16.50* |
| RR. grate bars | 15.25* |
| Cast iron brake shoes | 15.25* |
| Stove plate | 19.00* |
| Clean auto cast. | 20.00* |
| Cast iron carwheels | 20.00* |

## CINCINNATI

**Per gross ton delivered to consumer:**

| | |
|---|---|
| No. 1 hvy. melting | $19.50* |
| No. 2 hvy. melting | 19.50* |
| No. 1 bundles | 19.50* |
| No. 2 bundles | 19.50* |
| Mach. shop turn. | $10.50 to 11.00 |
| Shoveling turn. | 12.50 to 13.00 |
| Cast iron borings | 11.50 to 12.00 |
| Mixed bor. & turn. | 11.50 to 12.00 |
| Low phos. plate | 22.00* |
| No. 1 cupola cast. | 20.00* |
| Hvy. breakable cast. | 16.50* |
| Stove plate | 19.00* |
| Scrap rails | 21.00* |

## BOSTON

**Dealers' buying prices per gross ton, f.o.b. cars**

| | |
|---|---|
| No. 1 hvy. melting | $15.05* |
| No. 2 hvy. melting | 15.05* |
| No. 1 and 2 bundles | 15.05* |
| Busheling | 15.05* |
| Turnings, shovelings | 12.05* |
| Machine shop turn. | 10.05* |
| Mixed bor. & turn. | 10.05* |
| Cl'n cast, chem. bor. | $13.06 to 14.15* |

***Truck delivery to foundry***

| | |
|---|---|
| Machinery cast. | $21.00 to 23.51* |
| Breakable cast | 21.57 to 21.87* |
| Stove plate | 20.00 to 23.51* |

## DETROIT

**Per gross ton, brokers' buying prices:**

| | |
|---|---|
| No. 1 hvy. melting | $17.32* |
| No. 2 hvy. melting | 17.32* |
| No. 1 bundles | 17.32* |
| New busheling | 17.32* |
| Flashings | 17.32* |
| Mach. shop turn. | 12.32* |
| Short shov. turn. | 14.32* |
| Cast iron borings | 13.32* |
| Mixed bor. & turn. | 13.32* |
| Low phos. plate | 19.32* |
| No. 1 cupola cast. | 20.00* |
| Charging box cast. | 19.00* |
| Hvy. breakable cast. | 16.50* |
| Stove plate | 19.00* |
| Automotive cast | 20.00* |

## PHILADELPHIA

**Per gross ton delivered to consumer:**

| | |
|---|---|
| No. 1 hvy. melting | $18.75* |
| No. 2 hvy. melting | 18.75* |
| No. 2 bundles | 18.75* |
| Mach. shop turn. | 13.75* |
| Shoveling turn. | 15.75* |
| Cast iron borings | $13.50 to 14.00 |
| Mixed bor. & turn. | 13.75* |
| No. 1 cupola cast | 20.00* |
| Hvy. breakable cast | 16.50* |
| Cast, charging box | 19.00* |
| Hvy. axle forge turn. | 18.25* |
| Low phos. plate | 21.25* |
| Low phos. punchings | 21.25* |
| Billet crops | 21.25* |
| RR. steel wheels | 23.25* |
| RR. coil springs | 23.25* |
| RR. malleable | 22.00* |

## ST. LOUIS

**Per gross ton delivered to consumer:**

| | |
|---|---|
| Heavy melting | $17.50* |
| Bundled sheets | 17.50* |
| Mach. shop turn. | 12.50* |
| Locomotive tires, uncut | 18.50 to 19.00 |
| Misc. std. sec. rails | 19.00* |
| Rerolling rails | 21.00* |
| Steel angle bars | 21.00* |
| Rails 3 ft. and under | 21.50* |
| RR. springs | 22.00* |
| Steel car axles | 24.50* |
| Stove plate | 19.00* |
| Grate bars | 15.25* |
| Brake shoes | 15.25* |
| RR. malleable | 22.00* |
| Cast iron carwheels | 20.00* |
| No. 1 mach'ery cast | 20.00* |
| Breakable cast | 16.50* |

## BIRMINGHAM

**Per gross ton delivered to consumer:**

| | |
|---|---|
| No. 1 hvy. melting | $17.00* |
| No. 2 hvy. melting | 17.00* |
| No. 2 bundles | 17.00* |
| No. 1 busheling | 17.00* |
| Long turnings | 12.00* |
| Shoveling turnings | 14.00* |
| Cast iron borings | 13.00* |
| Bar crops and plate | 18.50 to 19.50* |
| Structural and plate | 18.50 to 19.50* |
| No. 1 cast | 20.00* |
| Stove plate | 19.00* |
| Steel axles | 18.50* |
| Scrap rails | 18.50 |
| Rerolling rails | 20.50* |
| Angles & splice bars | 20.50 to 21.00 |
| Rails 3 ft. & under | 21.00* |
| Cast iron carwheels | 17.50 to 18.00 |

## YOUNGSTOWN

**Per gross ton delivered to consumer:**

| | |
|---|---|
| No. 1 hvy. melting | $20.00* |
| No. 2 hvy. melting | 20.00* |
| Low phos. plate | 22.50* |
| No. 1 busheling | 20.00* |
| Hydraulic bundles | 20.00* |
| Mach. shop. turn. | 15.00* |
| Short shovel. turn. | 17.00* |
| Cast iron borings | 16.00* |

## NEW YORK

**Brokers' buying prices per gross ton, on cars:**

| | |
|---|---|
| No. 1 hvy. melting | $15.33* |
| No. 2 hvy. melting | 15.33* |
| Comp. black bundles | 15.33* |
| Comp. galv. bundles | 13.33* |
| Mach. shop turn. | 10.33* |
| Mixed bor. & turn. | 10.33* |
| Shoveling turn. | 12.33* |
| No. 1 cupola cast. | 20.00* |
| Hvy. breakable cast | 16.50* |
| Charging box cast | 19.00* |
| Stove plate | 19.00* |
| Clean auto cast. | 20.00* |
| Unstrip. motor blks. | 17.50* |
| Cl'n chem. cast bor. | 14.33* |

## BUFFALO

**Per gross ton delivered to consumer:**

| | |
|---|---|
| No. 1 hvy. melting | $19.25* |
| No. 1 bundles | 19.25* |
| No. 2 bundles | 19.25* |
| No. 2 hvy. melting | 19.25* |
| Mach. shop turn. | 14.25* |
| Shoveling turn. | 16.25* |
| Cast iron borings | 14.25* |
| Cast iron borings | 15.25* |
| Mixed bor. & turn. | 14.25* |
| Stove plate | 19.00* |
| Low phos. plate | 21.75* |
| Scrap rails | 20.75* |
| Rails 3 ft. & under | 23.75* |
| RR. steel wheels | 23.75* |
| Cast iron car wheels | 20.00* |
| RR. coil & leaf spgs. | 23.75* |
| RR. knuckles & coup. | 23.75* |
| RR. malleable | 22.00* |
| No. 1 busheling | 19.25* |

## CLEVELAND

**Per gross ton delivered to consumer:**

| | |
|---|---|
| No. 1 hvy. melting | $19.50* |
| No. 2 hvy. melting | 19.50* |
| Compressed sheet stl. | 19.50* |
| Drop forge flashings | 19.00 |
| No. 2 bundles | 19.50* |
| Mach. shop turn. | 14.50* |
| Short shovel. | 16.50* |
| No. 1 busheling | 19.50* |
| Steel axle turn. | 19.00* |
| Low phos. billet and bloom crops | 24.50* |
| Cast iron borings | 15.50* |
| Mixed bor. & turn. | 14.50* |
| No. 2 busheling | 17.00* |
| No. 1 machine cast | 20.00* |
| Railroad cast | 20.00* |
| Railroad grate bars | 15.25* |
| Stove plate | 19.00* |
| RR. hvy. melting | 20.50* |
| Rails 3 ft. & under | 23.00* |
| Rails 18 in. & under | 24.25* |
| Rails for rerolling | 23.00* |
| Railroad malleable | 22.00* |
| Elec. furnace punch | 22.00* |

## SAN FRANCISCO

**Per gross ton delivered to consumer:**

| | |
|---|---|
| RR. hvy. melting | $15.50 to $16.25 |
| No. 1 hvy. melting | 15.50 to 16.25 |
| No. 2 hvy melting | 14.50 to 15.25 |
| No. 2 bales | 12.50 to 13.25 |
| No. 3 bales | 8.50 to 9.25 |
| Mach. shop turn. | 7.00 |
| Elec. furn. 1 ft. und. | 15.50 to 17.00 |
| No. 1 cupola cast. | 19.00 to 21.00 |

## LOS ANGELES

**Per gross ton delivered to consumer.**

| | |
|---|---|
| No. 1 hvy. melting | $12.00 to $13.00 |
| No. 2 hvy. melting | 11.00 to 12.00 |
| No. 2 bales | 10.00 to 11.00 |
| No. 3 bales | 9.00 to 10.00 |
| Mach. shop turn. | 7.50 |
| No. 1 cupola cast. | 19.00 to 21.00 |

## SEATTLE

**Per gross ton delivered to consumer:**

| | |
|---|---|
| RR. hvy. melting | $10.00 |
| No. 1 & No. 2 hvy. melting | 10.00 |
| Elec. furn. 1 ft. und. | $14.00 to 15.00 |
| No. 1 cupola cast. | 20.00* |

## HAMILTON, ONT.

**Per gross ton delivered to consumer**

| | |
|---|---|
| Heavy melting | $17.50* |
| No. 1 bundles | 17.50* |
| No. 2 bundles | 17.00* |
| Mixed steel scrap | 15.50* |
| Rails, remelting | 18.50* |
| Rails, rerolling | 21.50* |
| Bushelings | 13.00* |
| Mixed borings & turnings | 12.50* |
| Electric furnace bundles | 20.50* |
| Manganese steel scrap | 20.00* |
| No. 1 cast | 19.00* |
| Stove plate | 17.50* |
| Car wheels, cast | 19.50* |
| Malleable iron | 16.00* |

# Comparison of Prices . .

[Advances over past week in Heavy Type; declines in *Italics*. Prices are f.o.b. major basing points. The various basing points for finished and semifinished steel are listed in the detailed price tables.]

| Flat-Rolled Steel: (cents per pound) | Dec. 11, 1945 | Dec. 4, 1945 | Nov. 6, 1945 | Dec. 12, 1944 |
|---|---|---|---|---|
| Hot-rolled sheets | 2.20 | 2.20 | 2.20 | 2.10 |
| Cold-rolled sheets | 3.05 | 3.05 | 3.05 | 3.05 |
| Galvanized sheets (24 ga.) | 3.70 | 3.70 | 3.70 | 3.50 |
| Hot-rolled strip | 2.10 | 2.10 | 2.10 | 2.10 |
| Cold-rolled strip | 2.80 | 2.80 | 2.80 | 2.80 |
| Plates | 2.25 | 2.25 | 2.25 | 2.10 |
| Plates, wrought iron | 3.80 | 3.80 | 3.80 | 3.80 |
| Stain's c-r strip (No. 302) | 28.00 | 28.00 | 28.00 | 28.00 |
| **Tin and Terneplate:** (dollars per base box) | | | | |
| Tinplate, standard cokes | $5.00 | $5.00 | $5.00 | $5.00 |
| Tinplate, electrolytic | 4.50 | 4.50 | 4.50 | 4.50 |
| Special coated mfg. ternes | 4.30 | 4.30 | 4.30 | 4.30 |
| **Bars and Shapes:** (cents per pound) | | | | |
| Merchant bars | 2.25 | 2.25 | 2.25 | 2.15 |
| Cold-finished bars | 2.75 | 2.75 | 2.75 | 2.65 |
| Alloy bars | 2.70 | 2.70 | 2.70 | 2.70 |
| Structural shapes | 2.10 | 2.10 | 2.10 | 2.10 |
| Stainless bars (No. 302) | 24.00 | 24.00 | 24.00 | 24.00 |
| Wrought iron bars | 4.40 | 4.40 | 4.40 | 4.40 |
| **Wire and Wire Products:** (cents per pound) | | | | |
| Bright wire | 2.75 | 2.75 | 2.75 | 2.60 |
| Wire nails | 2.90 | 2.90 | 2.90 | 2.55 |
| **Rails:** (dollars per gross ton) | | | | |
| Heavy rails | $43.00 | $43.00 | $43.00 | $40.00 |
| Light rails | 45.00 | 45.00 | 45.00 | 40.00 |
| **Semifinished Steel:** (dollars per gross ton) | | | | |
| Reroiling billets | $36.00 | $36.00 | $36.00 | $34.00 |
| Sheet bars | 36.00 | 36.00 | 36.00 | 34.00 |
| Slabs, rerolling | 36.00 | 36.00 | 36.00 | 34.00 |
| Forging billets | 42.00 | 42.00 | 42.00 | 40.00 |
| Alloy blooms, billets, slabs | 54.00 | 54.00 | 54.00 | 54.00 |
| **Wire Rods and Skelp:** (cents per pound) | | | | |
| Wire rods | 2.15 | 2.15 | 2.15 | 2.00 |
| Skelp | 1.90 | 1.90 | 1.90 | 1.90 |

| Pig Iron: (per gross ton) | Dec. 11, 1945 | Dec. 4, 1945 | Nov. 6, 1945 | Dec. 12, 1944 |
|---|---|---|---|---|
| No. 2 foundry, Phila. | $27.59 | $27.59 | $27.59 | $25.84 |
| No. 2, Valley furnace | 25.75 | 25.75 | 25.75 | 24.00 |
| No. 2, Southern, Cin'ti | 26.19 | 26.19 | 26.19 | 24.44 |
| No. 2, Birmingham | 22.13 | 22.13 | 22.13 | 20.38 |
| No. 2 foundry, Chicago† | 25.75 | 25.75 | 25.75 | 24.00 |
| Basic, del'd eastern Pa. | 27.09 | 27.09 | 27.09 | 25.34 |
| Basic, Valley furnace | 25.25 | 25.25 | 25.25 | 23.50 |
| Malleable, Chicago† | 25.75 | 25.75 | 25.75 | 24.00 |
| Malleable, Valley | 25.75 | 25.75 | 25.75 | 24.00 |
| L. S. charcoal, Chicago | 42.34 | 42.34 | 42.34 | 37.34 |
| Ferromanganese‡ | 135.00 | 135.00 | 135.00 | 135.00 |

† The switching charge for delivery to foundries in the Chicago district is 60¢ per ton.
‡ For carlots at seaboard.

| Scrap: (per gross ton) | | | | |
|---|---|---|---|---|
| Heavy melt'g steel, P'gh. | $20.00 | $20.00 | $20.00 | $20.00 |
| Heavy melt'g steel, Phila. | 18.75 | 18.75 | 18.75 | 18.75 |
| Heavy melt'g steel, Ch'go | 18.75 | 18.75 | 18.75 | 18.75 |
| No. 1 hy. comp. sheet, Det. | 17.32 | 17.32 | 17.32 | 17.32 |
| Low phos. plate, Youngs'n | 22.50 | 22.50 | 22.50 | 22.25 |
| No. 1 cast, Pittsburgh | 20.00 | 20.00 | 20.00 | 20.00 |
| No. 1 cast, Philadelphia | 20.00 | 20.00 | 20.00 | 20.00 |
| No. 1 cast, Chicago | 20.00 | 20.00 | 20.00 | 20.00 |
| **Coke, Connellsville:** (per net ton at oven) | | | | |
| Furnace coke, prompt | $7.50 | $7.50 | $7.50 | $7.00 |
| Foundry coke, prompt | 9.00 | 9.00 | 9.00 | 8.25 |
| **Nonferrous Metals:** (cents per pound to large buyers) | | | | |
| Copper, electro., Conn. | 12.00 | 12.00 | 12.00 | 12.00 |
| Copper, Lake | 12.00 | 12.00 | 12.00 | 12.00 |
| Tin, Straits, New York | 52.00 | 52.00 | 52.00 | 52.00 |
| Zinc, East St. Louis | 8.25 | 8.25 | 8.25 | 8.25 |
| Lead, St. Louis | 6.35 | 6.35 | 6.35 | 6.35 |
| Aluminum, virgin, del'd. | 15.00 | 15.00 | 15.00 | 15.00 |
| Nickel, electrolytic | 35.00 | 35.00 | 35.00 | 35.00 |
| Magnesium, ingot | 20.50 | 20.50 | 20.50 | 20.50 |
| Antimony, Laredo, Tex. | 14.50 | 14.50 | 14.50 | 14.50 |

# Composite Prices . .

[Starting with the issue of Apr. 22, 1943, the weighted finished steel index was revised for the years 1941, 1942 and 1943. See explanation of the change on p. 90 of the Apr. 22, 1943 issue. Index revised to a quarterly basis as of Nov. 14, 1944; for details see p. 98 of that issue. The finished steel composite prices for the current quarter are an estimate based on finished steel shipments for the previous quarter. These figures will be revised when the actual data of shipments for this quarter are compiled.]

| | FINISHED STEEL | PIG IRON | SCRAP STEEL |
|---|---|---|---|
| Dec. 11, 1945 | 2.44076¢ per lb. | $25.37 per gross ton | $19.17 per gross ton |
| One week ago | 2.44076¢ per lb. | $25.37 per gross ton | $19.17 per gross ton |
| One month ago | 2.44076¢ per lb. | $25.37 per gross ton | $19.17 per gross ton |
| One year ago | 2.21189¢ per lb. | $23.61 per gross ton | $19.17 per gross ton |

| | FINISHED STEEL HIGH | | FINISHED STEEL LOW | | PIG IRON HIGH | PIG IRON LOW | SCRAP STEEL HIGH | SCRAP STEEL LOW |
|---|---|---|---|---|---|---|---|---|
| 1945 | 2.44076¢ Oct. | 2 | 2.38444¢ Jan. | 2 | $25.37 Oct. 23 | $23.61 Jan. 2 | $19.17 | $19.17 |
| 1944 | 2.30837¢ Sept. | 5 | 2.21189¢ Oct. | 5 | $23.61 | $23.61 | 19.17 | $15.67 Oct. 24 |
| 1943 | 2.25513¢ | | 2.25513¢ | | 23.61 | 23.61 | 19.17 | $19.17 |
| 1942 | 2.26190¢ | | 2.26190¢ | | 23.61 | 23.61 | 19.17 | 19.17 |
| 1941 | 2.43078¢ | | 2.43078¢ | | $23.61 Mar. 20 | $23.45 Jan. 2 | $22.00 Jan. 7 | $19.17 Apr. 10 |
| 1940 | 2.30467¢ Jan. | 2 | 2.24107¢ Apr. | 16 | 23.45 Dec. 23 | 22.61 Jan. 2 | 21.83 Dec. 30 | 16.04 Apr. 9 |
| 1939 | 2.35367¢ Jan. | 3 | 2.26689¢ May | 16 | 22.61 Sept. 19 | 20.61 Sept. 12 | 22.50 Oct. 3 | 14.08 May 16 |
| 1938 | 2.58414¢ Jan. | 4 | 2.27207¢ Oct. | 18 | 23.25 June 21 | 19.61 July 6 | 15.00 Nov. 22 | 11.00 June 7 |
| 1937 | 2.58414¢ Mar. | 9 | 2.32263¢ Jan. | 4 | 23.25 Mar. 9 | 20.25 Feb. 16 | 21.92 Mar. 30 | 12.67 June 8 |
| 1936 | 2.32263¢ Dec. | 28 | 2.05200¢ Mar. | 10 | 19.74 Nov. 24 | 18.73 Aug. 11 | 17.75 Dec. 21 | 12.67 June 9 |
| 1935 | 2.07642¢ Oct. | 1 | 2.06492¢ Jan. | 8 | 18.84 Nov. 5 | 17.83 May 14 | 13.42 Dec. 10 | 10.33 Apr. 29 |
| 1934 | 2.15567¢ Apr. | 24 | 1.95757¢ Jan. | 2 | 17.90 May 1 | 16.90 Jan. 27 | 13.00 Mar. 13 | 9.50 Sept. 25 |
| 1933 | 1.95578¢ Oct. | 3 | 1.75836¢ May | 2 | 16.90 Dec. 5 | 13.56 Jan. 3 | 12.25 Aug. 8 | 6.75 Jan. 3 |
| 1932 | 1.89196¢ July | 5 | 1.83901¢ Mar. | 1 | 14.81 Jan. 5 | 13.56 Dec. 6 | 8.50 Jan. 12 | 6.43 July 5 |
| 1931 | 1.99626¢ Jan. | 13 | 1.86586¢ Dec. | 29 | 15.90 Jan. 6 | 14.79 Dec. 15 | 11.33 Jan. 6 | 8.50 Dec. 29 |
| 1930 | 2.25488¢ Jan. | 7 | 1.97319¢ Dec. | 9 | 18.21 Jan. 7 | 15.90 Dec. 16 | 15.00 Feb. 18 | 11.25 Dec. 9 |
| 1929 | 2.31773¢ May | 28 | 2.26498¢ Oct. | 29 | 18.71 May 14 | 18.21 Dec. 17 | 17.58 Jan. 29 | 14.08 Dec. 3 |

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing 78 per of the United States output. Index recapitulated in Aug. 28, 1941 issue.

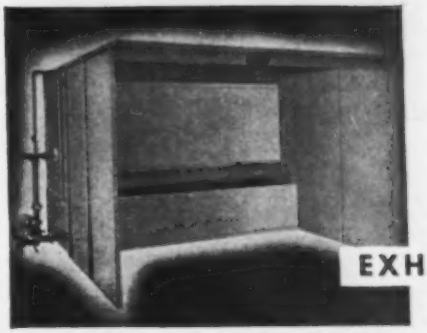
Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

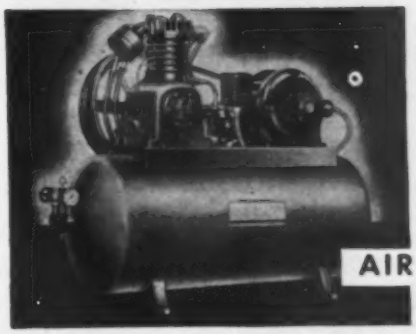
*Now at your service –*

# What we learned in war about all four...

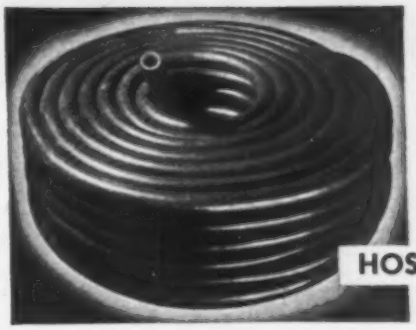
SPRAY EQUIPMENT



EXHAUST SYSTEMS



AIR COMPRESSORS



HOSE & CONNECTIONS

Many an "old dog" learned amazing new tricks at war. Among these was DeVilbiss, pioneer in spray painting equipment, pioneer of important improvements in exhaust systems, air compressors, hose and connections. In meeting the vast variety of unusual demands war placed on these four lines of products, DeVilbiss acquired worlds of new knowledge.

DeVilbiss engineers were continually called on to provide faster, more efficient ways of doing old jobs—and to adapt their products to the performance of many strange, new jobs. Through it all, DeVilbiss spray equipment, exhaust systems, air compressors, hose and connections consistently achieved the "impossible."

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**SPRAY EQUIPMENT • EXHAUST SYSTEMS • AIR COMPRESSORS • HOSE & CONNECTIONS**

# Iron and Steel Prices . . .

Steel prices shown here are f.o.b. basing points, in cents per pound or dollars per gross ton. Extras apply. Delivered prices do not reflect 3 pct tax on freight. (1) Mill run sheet, 10¢ per 100 lb under base; primes, 25¢ above base. (2) Unassorted commercial coating. (3) Widths up to 12-in. inclusive. (4) 0.25 carbon and less. (5) Applies to certain width and length limitations. (6) For merchant trade. (7) For straight length material only from producer to consumer. Discount of 25¢ per 100 lb to fabricators. (8) Also shafting. For quantities of 20,000 lb. to 39,999 lb. (9) Carload lot in manufacturing trade. (10) Prices do not apply if rail and water is not used. (11) Boxed. (12) This base price for annealed, bright finish wires, commercial spring wire. (13) Produced to dimensional tolerances in AISI Manual Sect. 6. (14) Billets only. (15) 9/32 in. to 47/64 in., 0.15c. per lb higher.

| Basing Points | Pittsburgh | Chicago | Gary | Cleveland | Birmingham | Buffalo | Youngstown | Sparrows Point | Granite City | Middletown, Ohio | Gulf Ports, Cars | Pacific Ports, Cars [10] | DELIVERED TO Detroit | New York | Philadelphia |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **INGOTS** | | | | | | | | | | | | | | | |
| Carbon, rerolling | ($31.00 f.o.b. mill) | | | | | | | | | | | | | | |
| Carbon, forging | $36 | $36 | $36 | $36 | $36 | $36 | $36 | | | | | | | | |
| Alloy | $45 | $45 | | | | $45 | (Bethlehem, Massillon, Canton, Coatesville—$45) | | | | | | | | |
| **BILLETS, BLOOMS, SLABS** | | | | | | | (Provo—$47.20, Duluth—$38[14]) | | | | | | | | |
| Carbon, rerolling | $36 | $36 | $36 | $36 | $36 | $36 | $36 | $36 | | | | $48[14] | $38 | | |
| | | | | | | | (Provo—$53.20, Duluth—$44[14]) | | | | | | | | |
| Carbon, forging | $42 | $42 | $42 | $42 | $42 | $42 | $42 | | | | | $54[14] | $44 | | |
| Alloy | $54 | $54 | | | | $54 | (Bethlehem, Massillon, Canton—$54) | | | | | | $56 | | |
| **SHEET BARS** | $36 | $36 | | $36 | | $36 | $36 | $36 | (Canton—$36) | | | | | | |
| **PIPE SKELP** | 1.90¢ | 1.90¢ | | | | | 1.90¢ | 1.90¢ | (Coatesville—1.90¢) | | | | | | |
| **WIRE RODS[15]** | | | | | | | | | | | | | | | |
| No. 5 to 9/32 in. | 2.15¢ | 2.15¢ | | 2.15¢ | 2.15¢ | (Worcester—2.25¢) | | | | | 2.40¢ | 2.65¢ | | | |
| **SHEETS** | | | | | | | | | | | | | | | |
| Hot-rolled | 2.20¢ | 2.20¢ | 2.20¢ | 2.20¢ | 2.20¢ | 2.20¢ | 2.20¢ | 2.20¢ | 2.30¢ | 2.20¢ | | 2.75¢ | 2.30¢ | 2.44¢ | 2.37¢ |
| Cold-rolled[1] | 3.05¢ | 3.05¢ | 3.05¢ | 3.05¢ | | 3.05¢ | 3.05¢ | | 3.15¢ | 3.05¢ | | 3.70¢ | 3.15¢ | 3.39¢ | 3.37¢ |
| Galvanized (24 gage) | 3.70¢ | 3.70¢ | 3.70¢ | | 3.70¢ | 3.70¢ | 3.70¢ | 3.70¢ | 3.80¢ | 3.70¢ | | 4.25¢ | | 3.94¢ | 3.87¢ |
| Enameling (20 gage) | 3.45¢ | 3.45¢ | 3.45¢ | 3.45¢ | | | 3.45¢ | | 3.55¢ | 3.45¢ | | 4.10¢ | 3.55¢ | 3.81¢ | 3.77¢ |
| Long ternes [2] | 3.80¢ | 3.80¢ | 3.80¢ | | | | | | | | | 4.55¢ | | 4.16¢ | 4.12¢ |
| **STRIP** | | | | | | | | | | | | | | | |
| Hot-rolled [3] | 2.10¢ | 2.10¢ | 2.10¢ | 2.10¢ | 2.10¢ | | 2.10¢ | | | 2.10¢ | | 2.75¢ | 2.20¢ | 2.46¢ | |
| Cold-rolled [4] | 2.80¢ | 2.90¢ | | 2.80¢ | | | 2.80¢ | (Worcester—3.00¢) | | | | | 2.90¢ | 3.16¢ | |
| Cooperage stock | 2.20¢ | 2.20¢ | | | 2.20¢ | | 2.20¢ | | | | | | | 2.56¢ | |
| Commodity cold-rolled | 2.95¢ | 3.05¢ | | 2.95¢ | | | 2.95¢ | (Worcester—3.35¢) | | | | | 3.05¢ | 3.31¢ | |
| **TINPLATE** | | | | | | | | | | | | | | | |
| Standard cokes, base box | $5.00 | $5.00 | $5.00 | | | | | | $5.10 | | | | | $5.36 | $5.32 |
| Electro, box 0.25 lb | $4.35 | $4.35 | $4.35 | | | | | | $4.60 | | | | | | |
| Electro, box 0.50 lb | $4.50 | $4.50 | $4.50 | | | | | | $4.75 | | | | | | |
| Electro, box 0.75 lb | $4.65 | | $4.65 | | | | | | | | | | | | |
| **BLACKPLATE** | | | | | | | | | | | | | | | |
| 29 gage [5] | 3.05¢ | 3.05¢ | 3.05¢ | | | | | | 3.15¢ | | | 4.05¢[11] | | | 3.37¢ |
| **TERNES, MFG.** | | | | | | | | | | | | | | | |
| Special coated, base box | $4.30 | $4.30 | $4.30 | | | | | | $4.40 | | | | | | |
| **BARS** | | | | | | | | (Duluth—2.35¢, | | | | | | | |
| Carbon steel | 2.25¢ | 2.25¢ | 2.25¢ | 2.25¢ | 2.25¢ | 2.25¢ | 2.25 | Provo, Utah 2.95¢) | | | 2.60¢ | 2.90¢ | 2.35¢ | 2.59¢ | 2.57¢ |
| Rail steel [6] | 2.25¢ | 2.25¢ | 2.25¢ | 2.25¢ | 2.25¢ | 2.25¢ | | | | | 2.60¢ | 2.90¢ | | | |
| Reinforcing (billet) [7] | 2.15¢ | 2.15¢ | 2.15¢ | 2.15¢ | 2.15¢ | 2.15¢ | 2.15¢ | 2.15¢ | | | 2.50¢ | 2.85¢ | 2.25¢ | 2.39¢ | |
| Reinforcing (rail) [7] | 2.15¢ | 2.15¢ | 2.15¢ | 2.15¢ | 2.15¢ | 2.15¢ | 2.15¢ | | | | 2.50¢ | 2.85¢ | 2.25¢ | | 2.47¢ |
| Cold-finished [8] | 2.75¢ | 2.75¢ | 2.75¢ | 2.75¢ | | 2.75¢ | | (Detroit—2.80¢) | | | (Toledo—2.90¢) | | | 3.09¢ | 3.07¢ |
| Alloy, hot-rolled | 2.70¢ | 2.70¢ | | | | 2.70¢ | 2.70 | (Bethlehem, Massillon, Canton—2.70¢) | | | | | 2.80¢ | | |
| Alloy, cold-drawn | 3.35¢ | 3.35¢ | 3.35¢ | 3.35¢ | | 3.35¢ | | | | | | | 3.45¢ | | |
| **PLATES** | | | | | | | | (Coatesville and Claymont—2.25¢, Provo, Utah 2.95¢) | | | | | | | |
| Carbon steel [13] | 2.25¢ | 2.25¢ | 2.25¢ | 2.25¢ | 2.25¢ | | 2.25¢ | 2.25¢ | | | 2.60¢ | 2.80¢ | 2.47¢ | 2.44¢ | 2.30¢ |
| Floor plates | 3.50¢ | 3.50¢ | | | | | | | | | 3.85¢ | 4.15¢ | | 3.86¢ | 3.82¢ |
| Alloy | 3.50¢ | 3.50¢ | | | (Coatesville—3.50¢) | | | | | | 3.95¢ | 4.15¢ | | 3.70¢ | 3.59¢ |
| **SHAPES** | | | | | | | | | | | | | | | |
| Structural | 2.10¢ | 2.10¢ | 2.10¢ | | 2.10¢ | 2.10¢ | (Bethlehem—2.10¢) | | | | 2.45¢ | 2.75¢ | | 2.27¢ | 2.215¢ |
| **SPRING STEEL, C-R** | | | | | | | | | | | | | | | |
| 0.26 to 0.50 carbon | 2.80¢ | | | 2.80¢ | | | (Worcester—3.00¢) | | | | | | | | |
| 0.51 to 0.75 carbon | 4.30¢ | | | 4.30¢ | | | (Worcester—4.50¢) | | | | | | | | |
| 0.76 to 1.00 carbon | 6.15¢ | | | 6.15¢ | | | (Worcester—6.35¢) | | | | | | | | |
| 1.01 to 1.25 carbon | 8.35¢ | | | 8.35¢ | | | (Worcester—8.55¢) | | | | | | | | |
| **WIRE [9]** | | | | | | | | | | | | | | | |
| Bright [12] | 2.75¢ | 2.75¢ | | 2.75¢ | 2.75¢ | | (Worcester—2.85¢) | | | (Duluth—2.80¢) | | 3.25¢ | | | 3.07¢ |
| Galvanized | Add proper size extra and galvanizing extra to Bright Wire base | | | | | | | | | | | | | | |
| Spring (high carbon) | 3.35¢ | 3.35¢ | | 3.35¢ | | | (Worcester—3.45¢) | | | | | 3.85¢ | | | 3.67¢ |
| **PILING** | | | | | | | | | | | | | | | |
| Steel sheet | 2.40¢ | 2.40¢ | | | | 2.40¢ | | | | | | 2.95¢ | | | 2.72¢ |

## CORROSION AND HEAT RESISTANT STEELS

In cents per pound, f.o.b. basing point

| BASING POINT | Chromium Nickel | | Straight Chromium | | | |
|---|---|---|---|---|---|---|
| | No. 304 | No. 302 | No. 410 | No. 430 | No. 442 | No. 446 |
| Ingot, P'gh, Chi, Canton, Balt, Reading, Ft. Wayne, Phila | Subject to negotiation | | | Subject to negotiation | | |
| Blooms, P'gh, Chi, Canton, Phila, Reading, Ft. Wayne, Balt | 21.25 | 20.40 | 15.725 | 16.15 | 19.125 | 23.375 |
| Slabs, P'gh, Chi, Canton, Balt, Phila, Reading | 21.25 | 20.40 | 15.725 | 16.15 | 19.125 | 23.375 |
| Billets, P'gh, Chi, Canton, Newark, N. J., Watervliet, Syracuse, Balt | Subject to negotiation | | | Subject to negotiation | | |
| Billets, forging, P'gh, Chi, Canton, Dunkirk, Balt, Phila, Reading, Watervliet, Syracuse, Newark, N. J., Ft. Wayne, Titusville | 21.25 | 20.40 | 15.725 | 16.15 | 19.125 | 23.375 |
| Bars, h-r, P'gh, Chi, Canton, Dunkirk, Watervliet, Newark, N. J., Syracuse, Balt, Phila, Reading, Ft. Wayne, Titusville | 25.00 | 24.00 | 18.50 | 19.00 | 22.50 | 27.50 |
| Bars, c-f, P'gh, Chi, Cleve, Canton, Dunkirk, Newark, N. J., Syracuse, Balt, Phila, Reading, Ft. Wayne, Watervliet | 25.00 | 24.00 | 19.50 | 19.00 | 22.50 | 27.50 |
| Plates, P'gh, Middletown, Canton | 29.00 | 27.00 | 21.50 | 22.00 | 26.50 | 30.50 |
| Shapes, structural, P'gh, Chi | 25.00 | 24.00 | 18.50 | 19.00 | 22.50 | 27.50 |
| Sheets, P'gh, Chi, Middletown, Canton, Balt | 36.00 | 34.00 | 26.50 | 29.00 | 32.50 | 36.50 |
| Strip, h-r, P'gh, Chi, Reading, Canton, Youngstown | 23.50 | 21.50 | 17.00 | 17.50 | 24.00 | 35.00 |
| Strip, c-r, P'gh, Cleve, Newark, N. J., Reading, Canton, Youngstown | 30.00 | 28.00 | 22.00 | 22.50 | 32.00 | 52.00 |
| Wire, c-d, Cleve, Dunkirk, Syracuse, Balt, Reading, Canton, P'gh, Newark, N. J., Phila | 25.00 | 24.00 | 18.50 | 19.00 | 22.50 | 27.50 |
| Wire flat, c-r, Cleve, Balt, Reading, Dunkirk, Canton | 30.00 | 28.00 | 22.00 | 22.50 | 32.00 | 52.00 |
| Rod, h-r, Newark, N. J. Syracuse | 25.00 | 24.00 | 18.50 | 19.00 | 22.50 | 27.50 |
| Tubing, seamless, P'gh Chi, Canton, (4 in. to 8 in.) | 66.63 | 66.63 | ..... | 63.30 | ..... | ..... |

## SHELL STEEL

| | per gross ton |
|---|---|
| 3 in. to 12 in. | $52.00 |
| 12 in. to 18 in. | 54.00 |
| 18 in. and over | 56.00 |

Basic openhearth shell steel, f.o.b. Pittsburgh, Chicago, Buffalo, Gary, Cleveland, Youngstown and Birmingham.

Prices delivered Detroit are $2.00 higher; East Michigan, $3 higher.

Price Exceptions: Follansbee Steel Corp. permitted to sell at $13.00 per gross ton, f.o.b. Toronto, Ohio, above base price of $52.00.

Note: The above base prices apply on lots of 1000 tons of a size and section to which are to be added extras for chemical requirements, cutting, or quantity.

## ELECTRICAL SHEETS

*(Base, f.o.b. Pittsburgh)*

| | per lb |
|---|---|
| Field grade | 3.30¢ |
| Armature | 3.65¢ |
| Electrical | 4.15¢ |
| Motor | 5.05¢ |
| Dynamo | 5.75¢ |
| Transformer 72 | 6.25¢ |
| Transformer 65 | 7.25¢ |
| Transformer 58 | 7.75¢ |
| Transformer 52 | 8.55¢ |

F.o.b. Granite City, add 10¢ per 100 lb on field grade to and including dynamo. Pacific ports add 75¢ per 100 lb on all grades.

## RAILS, TRACK SUPPLIES

*(F.o.b. mill)*

| | |
|---|---|
| Standard rails, heavier than 60 lb | |
| No. 1 O.H., gross ton | $43.00 |
| Angle splice bars, 100 lb | 2.70 |
| *(F.o.b. basing points)* | *per gross ton* |
| Light rails (from billets) | $45.00 |
| Light rails (from rail steel) | 44.00 |
| | *base per lb* |
| Cut spikes | 3.25¢ |
| Screw spikes | 5.40¢ |
| Tie plate, steel | 2.30¢ |
| Tie plates, Pacific Coast | 2.45¢ |
| Track bolts | 4.75¢ |
| Track bolts, heat treated, to railroads | 5.00¢ |
| Track bolts, jobbers discount | 63-5 |

Basing points, light rails, Pittsburgh, Chicago, Birmingham; cut spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo. Cut spikes alone—Youngstown, Lebanon, Pa., Richmond, Oregon and Washington ports, add 25¢.

## TOOL STEEL

*(F.o.b. Pittsburgh, Bethlehem, Syracuse, Dunkirk)*

| (*Also Canton, O.) | base per lb |
|---|---|
| High speed | 67¢ |
| Straight molybdenum | 54¢ |
| Tungsten-molybdenum | 57½¢ |
| High-carbon-chromium* | 43¢ |
| Oil hardening* | 24¢ |
| Special carbon* | 22¢ |
| Extra carbon* | 18¢ |
| Regular carbon* | 14¢ |

Warehouse prices east of Mississippi are 2¢ per lb higher; west of Mississippi 3¢ higher.

## CLAD STEEL

*Base prices, cents per pound*

| | Plate | Sheet |
|---|---|---|
| Stainless-clad | | |
| No. 304, 20 pct, f.o.b. Pittsburgh, Washington, Pa. | 18.00* | 19.00 |
| Nickel-clad | | |
| 10 pct, f.o.b. Coatesville, Pa. | 18.00 | .... |
| Inconel-clad | | |
| 10 pct, f.o.b. Coatesville | 25.00 | .... |
| Monel-clad | | |
| 10 pct, f.o.b. Coatesville | 24.00 | .... |
| Aluminized steel | | |
| Hot dip, 20 gage, f.o.b. Pittsburgh | .... | 9.00 |

*Includes annealing and pickling.

## WIRE PRODUCTS

*To the trade, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham, Duluth*

| | Basing Points Named | Pacific Coast Basing Points† |
|---|---|---|
| | *base per keg* | |
| Standard wire nails | $2.90 | $3.40 |
| Coated nails | 2.90 | 3.40 |
| Cut nails, carloads | 3.85 | .... |
| | *base per 100 lb* | |
| Annealed fence wire | $3.05 | $3.55 |
| Annealed galv. fence wire | 3.40 | 3.90 |
| | *base column* | |
| Woven wire fence* | 67 | 85 |
| Fence posts, carloads | 69 | 86 |
| Single loop bale ties | 66 | 91 |
| Galvanized barbed wire** | 72 | 82 |
| Twisted barbless wire | 72 | .... |

*15½ gage and heavier. **On 80-rod spools in carload quantities.

†Prices subject to switching or transportation charges.

## ROOFING TERNEPLATE

*(F.o.b. Pittsburgh, 112 sheets)*

| | 20x14 in. | 20x28 in. |
|---|---|---|
| 8-lb coating I.C. | $6.00 | $12.00 |
| 15-lb coating I.C. | 7.00 | 14.00 |
| 20-lb coating I.C. | 7.50 | 15.00 |

## ALLOY EXTRAS

| Alloy Steel | Basic Openhearth | | Electric Furnace | |
|---|---|---|---|---|
| | Bars and Bar-strip | Billets, Blooms, and Slabs | Bars and Bar-strip | Billets, Blooms, and Slabs |
| NE 8600 | 0.65¢ | $13.00 | $1.15 | $23.00 |
| NE 8700 | 0.70 | 14.00 | 1.20 | 24.00 |
| NE 9400 | 0.75 | 15.00 | 1.25 | 25.00 |
| NE 9700 | 0.65 | 13.00 | 1.15 | 23.00 |
| NE 9800 | 1.30 | 26.00 | 1.90 | 36.00 |
| NE 9900 | 1.20 | 24.00 | 1.55 | 31.00 |

The extras shown are in addition to the base price of $2.70 per 100 lb on finished products and $54 per gross ton on semifinished steel, major basing points, as shown in table, opposite page, and are in cents per pound when applicable to bars and bar-strip and in dollars per gross ton when applicable to billets, blooms and slabs. When acid openhearth is specified and acceptable, add to basic openhearth alloy differential 0.25¢ per lb for bars and bar-strip and $5 per gross ton for billets, blooms and slabs.

## WELDED PIPE AND TUBING

*Base discounts, f.o.b. Pittsburgh district and Lorain, Ohio, mills*

*(F.o.b. Pittsburgh only on wrought pipe) base price—$200.00 per net ton*

| | Black | Galv. |
|---|---|---|
| ***Steel (buttweld)*** | | |
| ½-in. | 63½ | 51 |
| ¾-in. | 66½ | 55 |
| 1-in. to 3-in. | 68½ | 57½ |
| ***Wrought Iron (buttweld)*** | | |
| ½-in. | 24 | 3½ |
| ¾-in. | 30 | 10 |
| 1-in. and 1¼-in. | 34 | 16 |
| 1½-in. | 38 | 18½ |
| 2-in. | 37½ | 18 |
| ***Steel (lapweld)*** | | |
| 2-in. | 61 | 49½ |
| 2½-in. and 3-in. | 64 | 52½ |
| 3½-in. to 6-in. | 66 | 54½ |
| ***Wrought Iron (lapweld)*** | | |
| 2-in. | 30½ | 12 |
| 2½-in. to 3½-in. | 31½ | 14½ |
| 4-in. | 33½ | 18 |
| 4½-in. to 8-in. | 32½ | 17 |
| ***Steel (butt, extra strong, plain ends)*** | | |
| ¼-in. | 61½ | 50½ |
| ⅜-in. | 65½ | 54½ |
| 1-in. to 3-in. | 67 | 57 |
| ***Wrought Iron (same as above)*** | | |
| ¼-in. | 25 | 6 |
| ⅜-in. | 31 | 12 |
| 1-in. to 2-in. | 38 | 19½ |
| ***Steel (lap, extra strong, plain ends)*** | | |
| 2-in. | 59 | 48½ |
| 2½-in. and 3-in. | 63 | 52½ |
| 3½-in. to 6-in. | 66½ | 56 |
| ***Wrought Iron (same as above)*** | | |
| 2-in. | 33½ | 15½ |
| 2½-in. to 4-in. | 39 | 22½ |
| 4½-in. to 6-in. | 37½ | 21 |

On buttweld and lapweld steel pipe jobbers are granted a discount of 5 pct. On l.c.l. shipments prices are determined by adding 25 pct and 30 pct and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount or $4 a ton higher than Pittsburgh or Lorain on lapweld and one point lower discount, or $2 a ton higher on all buttweld.

## BOILER TUBES

*Seamless steel and lapweld commercial boiler tubes and locomotive tubes, minimum wall. Net base prices per 100 ft f.o.b. Pittsburgh, in carload lots.*

| | Seamless Cold-Drawn | Seamless Hot-Rolled | Lapweld, Hot-Rolled |
|---|---|---|---|
| 2 in. O.D. 13 B.W.G. | 15.03 | 13.04 | 12.38 |
| 2½ in. O.D. 12 B.W.G. | 20.21 | 17.54 | 16.58 |
| 3 in. O.D. 12 B.W.G. | 22.48 | 19.50 | 18.35 |
| 3½ in. O.D. 11 B.W.G. | 28.37 | 24.62 | 23.15 |
| 4 in. O.D. 10 B.W.G. | 35.20 | 30.54 | 28.66 |

*(Extras for less carload quantities)*

| | |
|---|---|
| 40,000 lb or ft and over | Base |
| 30,000 lb or ft to 39,999 lb or ft | 5 pct |
| 20,000 lb or ft to 29,999 lb or ft | 10 pct |
| 10,000 lb or ft to 19,999 lb or ft | 20 pct |
| 5,000 lb or ft to 9,999 lb or ft | 30 pct |
| 2,000 lb or ft or 4,999 lb or ft | 45 pct |
| Under 2,000 lb or ft | 65 pct |

## CAST IRON WATER PIPE

| | Per Net Ton |
|---|---|
| 6-in. and larger, del'd Chicago | $54.80 |
| 6-in. and larger, del'd New York | 52.20 |
| 6-in. and larger, Birmingham | 46.00 |
| 6-in. and larger, f.o.b. cars, San Francisco or Los Angeles | 69.40 |
| 6-in. and larger f.o.b. cars, Seattle | 71.20 |

Class "A" and gas pipe, $3 extra; 4-in. pipe is $3 a ton above 6-in. Prices shown are for lots of less than 200 tons. For 200 tons or over, 6-in. and larger are $45 at Birmingham and $53.80 delivered Chicago, $59.40 at San Francisco and Los Angeles, and $70.20 at Seattle. Delivered prices do not reflect 3 pct tax on freight rates.

## BOLTS, NUTS, RIVETS, SET SCREWS

### *Bolts and Nuts*

*(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)*

**Machine and Carriage Bolts**

*Base discount less case lots*

| | Percent Off List |
|---|---|
| ½ in. & smaller x 6 in. & shorter | 65½ |
| 9/16 & ⅝ in. x 6 in. & shorter | 63½ |
| ¾ to 1 in. x 6 in. & shorter | 61 |
| 1⅛ in. and larger, all lengths | 59 |
| All diameters over 6 in. long | 59 |
| Lag, all sizes | 62 |
| Plow bolts | 65 |

**Nuts, Cold Punched or Hot Pressed**

*(Hexagon or Square)*

| | |
|---|---|
| ½ in. and smaller | 62 |
| 9/16 to 1 in. inclusive | 59 |
| 1⅛ to 1½ in. inclusive | 57 |
| 1⅝ in. and larger | 56 |

On above bolts and nuts, excepting plow bolts, additional allowance of 10 pct for full container quantities. There is an additional 5 pct allowance for carload shipments.

| Semifin. Hexagon Nuts | U.S.S. | S.A.E. |
|---|---|---|
| *Base discount less keg lots* | | |
| 7/16 in. and smaller | .. | 64 |
| ½ in. and smaller | 62 | .. |
| ½ in. through 1 in. | .. | 60 |
| 9/16 in. through 1 in. | 59 | .. |
| 1⅛ in. through 1½ in. | 57 | 58 |
| 1⅝ in. and larger | 56 | .. |

In full keg lots, 10 pct additional discount.

| *Stove Bolts* | Consumer |
|---|---|
| Packages, nuts loose | 71 and 10 |
| In packages | 71 |
| In bulk | 80 |

On stove bolts freight allowed up to 65¢ per 100 lb based on Cleveland, Chicago, New York on lots of 200 lb or over.

### *Large Rivets*

*(½ in. and larger)*

| | Base per 100 Lb |
|---|---|
| F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham | $3.75 |

### *Small Rivets*

*(7/16 in. and smaller)*

| | Percent Off List |
|---|---|
| F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham | 65 and 5 |

| *Cap and Set Screws* | Consumer Percent Off List |
|---|---|
| Upset full fin, hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in. | 64 |
| Upset set screws, cup and oval points | 71 |
| Milled studs | 46 |
| Flat head cap screws, listed sizes | 36 |
| Fillister head cap, listed sizes | 51 |

Freight allowed up to 65¢ per 100 lb based on Cleveland, Chicago or New York on lots of 200 lb or over.

## FLUORSPAR

Maximum price f.o.b. consumer's plant, $30 per short ton plus either (1) rail freight from producer to consumer, or (2) rail freight from Rosiclare, Ill., to consumer, whichever is lower.

### *Exception*

When the WPB Steel Div. certifies in writing the consumers need for one of the higher grades of metallurgical fluorspar specified in the table below the price shall be taken from the table plus items (1 and 2) from paragraph above.

| Effective $CaF_2$ Content: | Base price per short ton |
|---|---|
| 70% or more | $33.00 |
| 65% but less than 70% | 32.00 |
| 60% but less than 65% | 31.00 |
| Less than 60% | 30.00 |

## METAL POWDERS

Prices are based on current market prices of ingots plus a fixed figure. F.o.b. shipping point, cents per lb, ton lots.

| | |
|---|---|
| Copper, electrolytic, 150 and 200 mesh | 21½¢ to 23½¢ |
| Copper, reduced, 150 and 200 mesh | 20½¢ to 25½¢ |
| Iron, commercial, 100 and 200 mesh 96 + % Fe | 12½¢ to 15¢ |
| Iron, crushed, 200 mesh and finer, 90 + % Fe carload lots | 4¢ |
| Iron, hydrogen reduced, 300 mesh and finer, 98½ + % Fe, drum lots | 63¢ |
| Iron, electrolytic, unannealed, 300 mesh and coarser, 99 + % Fe | 30 to 33¢ |
| Iron, electrolytic, annealed minus 100 mesh, 99 + % Fe | 42¢ |
| Iron carbonyl, 300 mesh and finer, 98-99.8 + % Fe | 90¢ |
| Aluminum, 100 and 200 mesh | *35¢ |
| Antimony, 100 mesh | 30¢ |
| Cadmium, 100 mesh | $1.40 |
| Chromium, 100 mesh and finer | $1.25 |
| Lead, 100, 200 & 300 mesh | 11½ to 15¢ |
| Manganese | 65¢ |
| Nickel, 150 mesh | 51½¢ |
| Solder powder, 100 mesh | 8½¢ plus metal |
| Tin, 100 mesh | 58¾¢ |
| Tungsten metal powder, 98%-99%, any quantity, per lb | $2.60 |
| Molybdenum powder, 99%, in 200-lb kegs, f.o.b. York, Pa., per lb | $2.60 |
| Under 100 lb | $3.00 |

*Freight allowed east of Mississippi.

## COKE

| | Net Ton |
|---|---|
| **Furnace, beehive (f.o.b. oven)** | |
| Connellsville, Pa. | $7.50* |
| **Foundry, beehive (f.o.b. oven)** | |
| Fayette Co., W. Va. | 8.10 |
| Connellsville, Pa. | 9.00 |
| **Foundry, Byproduct** | |
| Chicago, del'd | 13.75 |
| Chicago, f.o.b. | 13.00 |
| New England, del'd | 14.65 |
| Kearny, N. J., f.o.b. | 13.05 |
| Philadelphia, del'd | 13.28 |
| Buffalo, del'd | 13.40 |
| Portsmouth, Ohio, f.o.b. | 11.50 |
| Painesville, Ohio, f.o.b. | 12.15 |
| Erie, del'd | 13.15 |
| Cleveland, del'd | 13.20 |
| Cincinnati, del'd | 13.25 |
| St. Louis, del'd | 14.25 |
| Birmingham, del'd | 10.90 |

*Hand drawn ovens using trucked coal permitted to charge $8.60 per ton plus transportation charges.

## REFRACTORIES

*(F.o.b. Works)*

### *Fire Clay Brick*

| | Per 1000 |
|---|---|
| Super-duty brick, St. Louis | $68.50 |
| First quality, Pa., Md., Ky., Mo., Ill. | 54.40 |
| First quality, New Jersey | 59.35 |
| Sec. quality, Pa., Md., Ky., Mo., Ill. | 49.35 |
| Sec. quality, New Jersey | 51.95 |
| No. 1 Ohio | 45.60 |
| Ground fire clay, net ton | 8.05 |

### *Silica Brick*

| | |
|---|---|
| Pennsylvania and Birmingham | $54.40 |
| Chicago District | 62.45 |
| Silica cement, net ton (Eastern) | 9.55 |

### *Chrome Brick*

| | Per Net Ton |
|---|---|
| Standard chemically bonded, Balt., Plymouth Meeting, Chester | $54.00 |

### *Magnesite Brick*

| | |
|---|---|
| Standard, Balt. and Chester | $76.00 |
| Chemically bonded, Baltimore | 65.00 |

### *Grain Magnesite*

| | |
|---|---|
| Domestic, f.o.b. Balt. and Chester in sacks (carloads) | $43.45 |
| Domestic, f.o.b. Chewelah, Wash. in bulk | 22.00 |
| in sacks | 26.00 |

## LAKE SUPERIOR ORES

*(51.50% Fe, Natural Content, Delivered Lower Lake Ports*)*

| | Per Gross Ton |
|---|---|
| Old range, bessemer, 51.50 | $4.75 |
| Old range, non-bessemer, 51.50 | 4.60 |
| Mesaba, bessemer, 51.50 | 4.60 |
| Mesaba, non-bessemer, 51.50 | 4.45 |
| High phosphorus, 51.50 | 4.35 |

*Adjustments are made to indicate prices based on variance of Fe content of ores as analyzed on a dry basis by independent laboratories.

## WAREHOUSE PRICES

*Delivered metropolitan areas per 100 lb. These are zoned warehouse prices in conformance with latest zoning amendment to OPA Price Schedule 49.*

| Cities | SHEETS | | | STRIP | | Plates ¼ in. and heavier | Structural Shapes | BARS | | ALLOY BARS | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Hot Rolled (10 gage) | Cold Rolled | Galvanized (24 gage) | Hot Rolled | Cold Rolled | | | Hot Rolled | Cold Finished | Hot Rolled, NE 8617-20 | Hot Rolled, NE 9442-45 Ann. | Cold Drawn, NE 8617-20 | Cold Drawn, NE 9442-40 Ann. |
| **Philadelphia | $3.518 | $4.8725 | $4.768a | $3.922 | $4.772 | $3.605 | $3.686 | $3.822 | $4.172 | $5.818 | $8.868 | $7.072 | $8.172 |
| New York | 3.59 | 4.613[3] | 5.110 | 3.974[6] | 4.772 | 3.768 | 3.758 | 3.853 | 4.203 | 5.858 | 8.908 | 7.103 | 8.203 |
| Boston | 3.744 | 4.744[9] | 5.224[9] | 4.106 | 4.715 | 3.912 | 3.912 | 4.044 | 4.244 | 6.012 | 7.062 | 7.194 | 8.394 |
| Baltimore | 3.394 | 4.552 | 4.894 | 3.902 | 4.752 | 3.594 | 3.759 | 3.802 | 4.152 | .... | .... | .... | .... |
| Norfolk | 3.771 | 4.965 | 5.371 | 4.165 | 4.865 | 3.971 | 4.002 | 4.065 | 4.265 | .... | .... | .... | .... |
| Chicago | 3.25 | 4.20 | 5.231 | 3.60 | 4.65[17] | 3.55 | 3.55 | 3.50 | 3.85 | 5.80 | 6.65 | 6.65 | 7.80 |
| Milwaukee | 3.387 | 4.337[3] | 5.272[4] | 3.737 | 4.787[17] | 3.687 | 3.687 | 3.637 | 3.997 | 5.837 | 6.887 | 6.887 | 7.987 |
| Cleveland | 3.35 | 4.40 | 4.877[4] | 3.60 | 4.45 | 3.40 | 3.588 | 3.35 | 3.85 | 5.806 | 6.856 | 6.65 | 7.75 |
| Buffalo | 3.35 | 4.40 | 4.75[4] | 3.819 | 4.869 | 3.63 | 3.40 | 3.35 | 3.85 | 5.80 | 6.85 | 6.65 | 7.75 |
| Detroit | 3.45 | 4.50 | 5.00[4] | 3.70 | 4.859[17] | 3.609 | 3.661 | 3.45 | 3.90 | 5.93 | 6.98 | 6.939 | 8.039 |
| Cincinnati | 3.425 | 4.475[3] | 4.825[5] | 3.675 | 4.711 | 3.661 | 3.691 | 3.611 | 4.111 | 5.95 | 7.00 | 7.011 | 8.261 |
| St. Louis | 3.397 | 4.347[3] | 5.172[4] | 3.747 | 4.931[17] | 3.697 | 3.697 | 3.647 | 4.131 | 5.981 | 7.031 | 7.031 | 8.131 |
| Pittsburgh | 3.35 | 4.40 | 4.75 | 3.60 | 4.45 | 3.40 | 3.40 | 3.35 | 3.85 | 5.80 | 6.65 | 6.65 | 7.90 |
| St. Paul | 3.50 | 4.46 | 5.257[4] | 3.86 | 5.102[17] | 3.811[3] | 3.811[3] | 3.761[3] | 3.461 | 5.94 | 5.99 | 7.361 | 8.461 |
| Omaha | 3.865 | 5.443 | 5.608[4] | 4.215 | .... | 4.165 | 4.165 | 4.115 | 4.543 | .... | .... | .... | .... |
| Indianapolis | 3.518 | 4.568 | 4.918 | 3.768 | 4.741 | 3.63 | 3.63 | 3.58 | 4.00 | 5.93 | 6.98 | 6.98 | 8.23 |
| Birmingham | 3.45 | .... | 4.75 | 3.70 | .... | 3.55 | 3.55 | 3.50 | 4.53 | .... | .... | .... | .... |
| Memphis | 3.965[7] | 4.66 | 5.268 | 4.215 | .... | 4.065 | 4.065 | 4.015 | 4.33 | .... | .... | .... | .... |
| New Orleans | 4.058* | 5.079 | 5.358 | 4.308 | .... | 4.158 | 4.158* | 4.108* | 4.729 | .... | .... | .... | .... |
| Houston | 3.763 | 5.573 | 6.313[1] | 4.313 | .... | 4.25 | 4.25 | 3.75 | 6.473[3] | 7.223 | 8.323 | 8.323 | 9.373 |
| Los Angeles | 5.00 | 7.20[3] | 6.10[4] | 4.95 | 5.613[18] | 4.95 | 4.65 | 4.40 | 5.683 | 8.204 | 9.404 | 9.304 | 10.454 |
| San Francisco | 4.55[14] | 7.30[4] | 6 35[4] | 4.50[14] | 7.333[17] | 4.65[14] | 4.35[14] | 4.15[14] | 5.433 | 8.304 | 9.404 | 9.404 | 10.454 |
| Seattle | 4.65[12] | 7.05[4] | 5.95[4] | 4.25[12] | .... | 4.75[12] | 4 45[12] | 4.35[12] | 5.883 | | 9.404 | | |
| Portland | 4.65[11] | 6.60[4] | 5.75[4] | 4.75[11] | .... | 4.85[11] | 4 45[11] | 4.45[11] | 5.633 | 8.304 | 9.404 | 8.304 | 9.404 |
| Salt Lake City | 4.530[17] | .... | 6.171[3] | 5.53[17] | .... | 4.98[17] | 4.98[17] | 4.88[17] | 6.00 | .... | .... | .... | .... |

### BASE QUANTITIES

*Standard unless otherwise keyed on prices.*

**HOT-ROLLED:** Sheets, strip, plates, shapes and bars, 400 to 1999 lb.

**COLD-ROLLED:** Sheets, 400 to 1499 lb; strip, extras on all quantities; bars, 1500 lb base.

**NE ALLOY BARS:** 1000 to 39,999 lb.

**EXCEPTIONS:** (1) 150 to 499 lb. (2) 150 to 1499 lb. (3) 400 to 1499 lb. (4) 450 to 1499 lb. (5) 500 to 1499 lb. (6) 0 to 199 lb. (7) 400 to 1499 lb. (8) 1000 to 1999 lb. (9) 450 to 3749 lb. (10) 400 to 3999 lb. (11) 800 to 4999 lb. (12) 800 to 10,000 lb. (13) 400 to 14,999 lb. (14) 400 lb and over. (15) 1000 lb and over. (16) 1500 lb and over. (17) 2000 lb and over. (18) 3500 lb and over.

(*) Philadelphia: Galvanized sheet, 25 or more bundles.

Extra for size, quality, etc., apply on above quotations.

*Add 0.27¢ for sizes not rolled in Birmingham.

**City of Philadelphia only. Applicable freight rates must be added to basing point prices to obtain delivered price to other localities in metropolitan area.

## PIG IRON PRICES

Maximum per gross ton, established by OPA Oct. 22, 1945. Prices do not reflect 3 pct tax on freight.

### BASING POINT PRICES

| Basing Point | Basic | No. 2 Foundry | Malleable | Bessemer | Low Phos. |
|---|---|---|---|---|---|
| Bethlehem | $26.25 | $26.75 | $27.25 | $27.75 | .... |
| Birdsboro | 26.25 | 26.75 | 27.25 | 27.75 | $31.25 |
| Birmingham | 20.75 | 22.13 | .... | 26.75 | .... |
| Buffalo | 24.75 | 25.75 | 26.25 | 26.75 | 31.25 |
| Chicago | 25.25 | 25.75 | 25.75 | 26.25 | ..... |
| Cleveland | 25.25 | 25.75 | 25.75 | 26.25 | ..... |
| Detroit | 25.25 | 25.75 | 25.75 | 26.25 | ..... |
| Duluth | 25.75 | 26.25 | 26.25 | 26.75 | ..... |
| Erie | 25.25 | 25.75 | 26.25 | 26.75 | ..... |
| Everett | 26.25 | 26.75 | 27.25 | 27.75 | ..... |
| Granite City | 25.25 | 25 75 | 25.75 | 26.25 | ..... |
| Hamilton | 25.25 | 25 75 | 25.75 | .... | ..... |
| Neville Island | 25.25 | 25.75 | 25.75 | 26.25 | ..... |
| Provo | 23.25 | 23.75 | .... | .... | ..... |
| Sharpsville 1 | 25.25 | 25.75 | 25.75 | 26.25 | ..... |
| Sparrows Point | 26.25 | 26.75 | ..... | .. .. | ..... |
| Steelton | 26.25 | .... | .... | .... | 31.25 |
| Swedeland | 26.25 | 26.75 | 27.25 | 27.75 | ..... |
| Toledo | 25.25 | 25.75 | 25.75 | 26.25 | ..... |
| Youngstown | 25.25 | 25.75 | 25.75 | 26.25 | ..... |

### DELIVERED PRICES (BASE GRADES)

| Consuming Point | Basing Point | Freight Rate | Basic | No. 2 Foundry | Malleable | Bessemer | Low Phos. |
|---|---|---|---|---|---|---|---|
| Boston | Everett | $ .50 | $26.75 | $27.25 | $27.75 | $28.25 | .... |
| Boston | Bethlehem-Steelton | 4.02 | | | | | $35.27 |
| Brooklyn | Bethlehem | 2.50 | 28.75 | 29.25 | 29.75 | 30.25 | |
| Brooklyn | Birdsboro | 2.02 | | | | | 34.17 |
| Canton | Cle, Yngstn, Sharpevil. | 1.39 | 26.64 | 27.14 | 27.14 | 27.64 | |
| Canton | Buffalo | 3.19 | | | | | 34.44 |
| Cincinnati | Birmingham | 4.06 | 24.81 | 25.19 | .... | .... | .... |
| Cincinnati | Hamilton | 1.11 | .... | .... | 25.86 | .... | |
| Cincinnati | Buffalo | 4.40 | | | | | 35.65 |
| Jersey City | Bethlehem | 1.53 | 27.78 | 28.28 | 28.78 | 29.28 | |
| Jersey City | Birdsboro | 1.94 | | | | | 33.19 |
| Los Angeles | Provo | 4.95 | 28.20 | 28.70 | .... | .... | .... |
| Los Angeles | Buffalo | 15.41 | | | | | 46.66 |
| Mansfield | Cleveland & Toledo | 1.94 | 27.19 | 27.69 | 27.69 | 28.19 | |
| Mansfield | Buffalo | 3.38 | | | | | 34.61 |
| Philadelphia | Swedeland | .84 | 27.09 | 27.59 | 28.09 | 28.59 | |
| Philadelphia | Birdsboro | 1.24 | | | | | 32.49 |
| San Francisco | Provo | 4.95 | 28.20 | 28.70 | .... | .... | .... |
| San Francisco | Buffalo | 15.41 | | | | | 46.66 |
| Seattle | Provo | 4.95 | 28.20 | 28.70 | .... | .... | .... |
| Seattle | Buffalo | 15.41 | | | | | 46.66 |
| St. Louis | Granite City | .50 | 25.75 | 26.25 | 26.25 | 26.75 | .... |
| St. Louis | Buffalo | 7.07 | ..... | ..... | ..... | ..... | 38.32 |

(1) Struthers Iron & Steel Co., Struthers, Ohio, may charge 50¢ a ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable.

Charcoal pig iron base prices for Lyles, Tenn., and Lake Superior furnaces, $33.00 and $34.00, respectively. Newberry Brand of Lake Superior charcoal iron $39.00 per g.t., f.o.b. furnace, by order L 39 to RPS 10. Apr. 11, 1945, retroactive to Mar. 7, 1945. Delivered to Chicago, $42.84. High phosphorus iron sells at Lyles, Tenn., at $28.50.

Basing point prices are subject to switching charges; Silicon differentials (not to exceed 50¢ a ton for each 0.25 pct silicon content in excess of base grade which is 1.75 to 2.25 pct); Phosphorus differentials, a reduction of 38¢ per ton for phosphorus content of 0.70 pct and over; Manganese differentials, a charge not to exceed 50¢ per ton for each 0.50 pct manganese content in excess of 1.00 pct. Effective Mar. 3, 1943, $2 per ton extra may be charged for 0.5 to 0.75 pct nickel content and $1 per ton extra for each additional 0.25 pct nickel.

Silvery iron and bessemer ferrosilicon up to and including 14.00 pct silicon covered by RPS 10 as amended Feb. 14, 1945. Silvery iron, silicon 6.00 to 6.50 pct, C/L per g.t., f.o.b. Jackson, Ohio—$31.25; f.o.b. Buffalo—$32.50. Add $1.00 per ton for each additional 0.50 pct Si. Add 50¢ per ton for each 0.50 pct Mn over 1.00 pct. Add $1.00 per ton for prices of comparable analysis.

### *Ferromanganese*

78-82% Mn, maximum contract base price per gross ton, lump size, f.o.b. car at Baltimore, Philadelphia, New York, Birmingham, Rockdale, Rockwood, Tenn.

| | |
|---|---|
| Carload lots (bulk) | $135.00 |
| Less ton lots (packed) | 148.50 |
| F.o.b. Pittsburgh | 139.50 |

$1.70 for each 1% above 82% Mn; penalty, $1.70 for each 1% below 78%.

### *Ferromanganese Briquets*

Contract prices per pound of briquet, f.o.b. shipping point, freight allowed to destination. Approx. 66% contained Mn. Add 0.25¢ for spot sales.

| | Eastern | Central | Western |
|---|---|---|---|
| Carload, bulk | 6.05¢ | 6.30¢ | 6.60¢ |
| Ton lots | 6.65¢ | 7.55¢ | 8.55¢ |
| Less ton lots | 6.80¢ | 7.80¢ | 8.80¢ |

### *Manganese Metal*

Contract basis, lump size, per pound of metal, f.o.b. shipping point with freight allowed. Spot sales add 2¢ per lb.

96-98% Mn, .2% max. C, 1% max. Si, 2% max. Fe.

| | |
|---|---|
| Carload, bulk | 30¢ |
| L.c.l. lots | 32¢ |

### *Electrolytic Manganese*

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.

| | |
|---|---|
| Carloads | 34¢ |
| Ton lots | 36¢ |
| Less ton lots | 38¢ |

### *Spiegeleisen*

Maximum base contract prices per gross ton, lump, f.o.b. Palmerton, Pa.

| | 16-19% Mn 3% max. Si | 19-21% Mn 3% max. Si |
|---|---|---|
| Carloads | $35.00 | $36.00 |
| Less ton | 47.50 | 48.50 |
| F.o.b. Pittsburgh, Chicago | 40.00 | |

### *Low-Carbon Ferromanganese*

Contract prices per pound of manganese contained, lump size, f.o.b. shipping point, freight allowed to destination, eastern zone. Add 0.25¢ for spot sales.

| | Carloads, Bulk | Ton Lots | Less Ton |
|---|---|---|---|
| 0.06% C, 0.06% P, 90% Mn | 23.00¢ | 23.40¢ | 23.65¢ |
| 0.10% max. C, 1% or 2% max. Si | 23.00¢ | 23.40¢ | 23.65¢ |
| 0.15% max. C, 1% or 2% max. Si | 22.00¢ | 22.40¢ | 22.65¢ |
| 0.30% max. C, 1% or 2% max. Si | 21.00¢ | 21.40¢ | 21.65¢ |
| 0.50% max. C, 1% or 2% max. Si | 20.00¢ | 20.40¢ | 20.65¢ |
| 0.75% max. C, 7.00% max. Si | 16.00¢ | 16.40¢ | 16.65¢ |

### *Electric Ferrosilicon*

OPA maximum base price cents per pound contained Si, lump size in carloads, f.o.b. shipping point with freight allowed.

| | Eastern | Central | Western |
|---|---|---|---|
| 50% Si | 6.65¢ | 7.10¢ | 7.25¢ |
| 75% Si | 8.05¢ | 8.20¢ | 8.75¢ |
| 80-90% Si | 8.90¢ | 9.05¢ | 9.55¢ |
| 90-95% Si | 11.05¢ | 11.20¢ | 11.65¢ |

### *Silvery Iron*

Si 14.01 to 14.50%, $45.50 per G. T. f.o.b. Jackson, Ohio. Add $1.00 per ton for each additional 0.50% Si up to and including 18%. Add $1.00 per ton for low impurities, not to exceed: P—0.05%, S—0.04%, C—1.00%. Covered by MPR 405.

### *Silicon Metal*

OPA maximum base price per pound of contained Si, lump size, f.o.b. shipping point with freight allowed to destination, for l.c.l. above 2000 lb, packed. Add 0.25¢ for spot sales.

| | Eastern | Central | Western |
|---|---|---|---|
| 96% Si, 2% Fe | 13.10¢ | 13.55¢ | 16.50¢ |
| 97% Si, 1% Fe | 13.45¢ | 13.90¢ | 16.80¢ |

### *Ferrosilicon Briquets*

OPA maximum base price per pound of briquet, bulk, f.o.b. shipping point with freight allowed to destination. Approximately 40% Si. Add 25¢ for spot sales.

| | Eastern | Central | Western |
|---|---|---|---|
| Carload, bulk | 3.35¢ | 3.50¢ | 3.65¢ |
| 2000 lb-carload | 3.80¢ | 4.20¢ | 4.25¢ |

### *Silicomanganese*

Contract basis lump size, per pound of metal, f.o.b. shipping point with freight allowed. Add 25¢ for spot sales. 65-70% Mn, 17-20% Si, 1.5% max. C.

| | |
|---|---|
| Carload, bulk | 6.05¢ |
| 2000 lb to carload | 6.70¢ |
| Briquet, contract basis, carlots, bulk freight allowed, per lb | 5.80¢ |
| 2000 lb to carload | 6.30¢ |
| Less ton lots | 6.55¢ |

### *Ferrochrome*

(65-72% *Cr*, 2% *max. Si*)

OPA maximum base contract prices per pound of contained Cr, lump size in carload lots, f.o.b. shipping point, freight allowed to destination. Add 0.25¢ per lb contained Cr for spot sales.

| | Eastern | Central | Western |
|---|---|---|---|
| 0.06% C | 23.00¢ | 23.40¢ | 24.00¢ |
| 0.10% C | 22.50¢ | 22.90¢ | 23.50¢ |
| 0.15% C | 22.00¢ | 22.40¢ | 23.00¢ |
| 0.20% C | 21.50¢ | 21.90¢ | 22.50¢ |
| 0.50% C | 21.00¢ | 21.40¢ | 22.00¢ |
| 1.00% C | 20.50¢ | 20.90¢ | 21.50¢ |
| 2.00% C | 19.50¢ | 19.90¢ | 21.00¢ |
| 66-71% Cr, 4-10% C | 13.00¢ | 13.40¢ | 14.00¢ |
| 62-66% Cr, 5-7% C | 13.50¢ | 13.90¢ | 14.50¢ |

### *High-Nitrogen Ferrochrome*

Low-carbon type: 67-72% Cr, 0.75% N. Add 2¢ per lb to regular low-carbon ferrochrome price schedule. Add 2¢ for each additional 0.25% N. High-carbon type: 66-71% Cr, 4-5% C. 0.75% N. Add 5¢ per lb to regular high-carbon ferrochrome price schedule.

### *Ferrochrome Briquets*

Contract prices per pound of briquet, f.o.b. shipping point, freight allowed to destination. Approx. 60% contained chromium. Add 0.25¢ for spot sales.

| | Eastern | Central | Western |
|---|---|---|---|
| Carload, bulk | 8.25¢ | 8.55¢ | 8.95¢ |
| Ton lots | 8.75¢ | 9.25¢ | 10.75¢ |
| Less ton lots | 9.00¢ | 9.50¢ | 11.00¢ |

### *Calcium—Manganese—Silicon*

Contract prices per pound of alloy, lump size, f.o.b. shipping point, freight allowed to destination.

16-20% Ca, 14-18% Mn, 53-59% Si. Add 0.25¢ for spot sales.

| | Eastern | Central | Western |
|---|---|---|---|
| Carloads | 15.50¢ | 16.00¢ | 18.05¢ |
| Ton lots | 16.50¢ | 17.35¢ | 19.10¢ |
| Less ton lots | 17.00¢ | 17.35¢ | 19.60¢ |

### *Calcium Metal*

Eastern zone contract prices per pound of metal, f.o.b. shipping point, freight allowed to destination. Add 5¢ for spot sales. Add 0.9¢ for central zone; 0.49¢ for western zone.

| | Cast | Turnings | Distilled |
|---|---|---|---|
| Ton lots | $1.80 | $2.30 | $5.00 |
| Less ton lots | 2.30 | 2.80 | 5.75 |

### *Chromium—Copper*

Contract price per pound of alloy, f.o.b. Niagara Falls, freight allowed east of the Mississippi. 8-11% Cr, 88-90% Cu, 1.00% max. Fe, 0.50% max. Si. Add 2¢ for spot sales.

| | |
|---|---|
| Shot or ingot | 45¢ |

### *Ferroboron*

Contract prices per pound of alloy, f.o.b. shipping point, freight allowed to destination. Add 5¢ for spot sales. 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% Max. C.

| | Eastern | Central | Western |
|---|---|---|---|
| Ton lots | $1.20 | $1.2075 | $1.229 |
| Less ton lots | 1.30 | 1.3075 | 1.329 |

### *Manganese—Boron*

Contract prices per pound of alloy, f.o.b. shipping point, freight charges allowed. Add 5¢ for spot sales.

75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C.

| | Eastern | Central | Western |
|---|---|---|---|
| Ton lots | $1.89 | $1.903 | $1.935 |
| Less ton lots | 2.01 | 2.023 | 2.055 |

### *Nickel—Boron*

Spot and contract prices per pound of alloy, f.o.b. shipping point, freight allowed to destination.

15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni.

| | Eastern | Central | Western |
|---|---|---|---|
| 11,200 lb or more | $1.90 | $1.9125 | $1.9445 |
| Ton lots | 2.00 | 2.09125 | 2.0445 |
| Less ton lots | 2.10 | 2.1125 | 2.1445 |

### *Other Ferroalloys*

| | |
|---|---|
| Ferrotungsten, standard grade lump or ¼X down, packed f.o.b. plant at Niagara Falls, New York, Washington, Pa., York, Pa., per pound contained tungsten, 10,000 lb or more | $1.90 |
| Ferrovanadium, 35-55%, contract basis, f.o.b. plant, usual freight allowances, per pound contained V. | |
| Openhearth | $2.70 |
| Crucible | $2.80 |
| Primos | $2.90 |
| Cobalt, 97% min., keg packed, contract basis, f.o.b. producers plant, usual freight allowances, per pound of cobalt metal | $1.50 |
| Vanadium pentoxide, 88-92% $V_2O_5$ technical grade, contract basis, any quantity, per pound conatined $V_2O_5$. Spot sales add 5¢ per lb contained $V_2O_5$ | $1.10 |
| Silcaz No. 3, contract basis, f.o.b. plant with usual freight allowances, per pound of alloy. | |
| carload lots | 25¢ |
| 2000 lb to carload | 26¢ |
| Silvaz No. 3, contract basis, f.o.b. plant with freight allowances, per pound of alloy. | |
| Carload lots | 58¢ |
| 2000 lb to carload | 59¢ |
| Grainal, f.o.b. Bridgeville, Pa., freight allowed 50 lb and over, max. based on rate to St. Louis | |
| No. 1 | 87.5¢ |
| No. 6 | 60¢ |
| No. 79 | 45¢ |
| Bortram, f.o.b. Niagara Falls | |
| Ton lots, per lb | 45¢ |
| Less ton lots, per lb | 50¢ |
| Ferrocolumbium, 50-60%, contract basis, f.o.b. plant with freight allowances, per pound contained Cb. | |
| 2000-lb lots | $2.25 |
| Under 2000-lb lots | $2.30 |
| Ferrotitanium, 40-45%, 0.10% C. max. f.o.b. Niagara Falls, N. Y., ton lots, per pound contained Ti | $1.23 |
| Less ton lots | $1.25 |
| Ferrotitanium, 20-25%, 0.10% C. max., ton lots, per pound contained titanium | $1.35 |
| Less ton lots | $1.40 |
| High-carbon ferrotitanium, 15-20%, 6-8% carbon, contract basis, f.o.b. Niagara Falls, N. Y. freight allowed east of Mississippi, north of Baltimore and St. Louis, per carload | $142.50 |
| Ferrophosphorus, 18% electric or blast furnaces, f.o.b. Anniston, Ala., carlots, with $3 unitage freight equalled with Rockdale, Tenn., per gross ton | $58.50 |
| Ferrophosphorus, electrolytic 23-26%, carlots, f.o.b. Monsanto (Siglo), Tenn., $3 unitage freight equalized with Nashville, per gross ton | $75.00 |
| Ferromolybdenum, 55-75%, f.o.b. Langeloth, Washington, Pa., any quantity, per pound contained Mo | 95¢ |
| Calcium molybdate, 40-45%, f.o.b. Langeloth and Washington, Pa., any quantity, per pound contained Mo | 80¢ |
| Molybdenum oxide briquets, 48-52% Mo g.o.b. Langeloth, Pa., per pound contained Mo | 80¢ |
| Molybdenum oxide, in cans, f.o.b. Langeloth and Washington, Pa., per pound contained Mo | 80¢ |
| Zirconium, 35-40%, contract basis, f.o.b. producer's plant with freight allowances, per pound of alloy. Add ¼¢ for spot sales | |
| Carload lots | 14¢ |
| Zirconium, 12-15%, contract basis, lump f.o.b. plant usual freight allowances, per pound of alloy | |
| Carload, bulk | 4.80¢ |
| Alsifer (approx. 20% Al, 40% Si and 40% Fe), contract basis, f.o.b. Niagara Falls, carload, bulk | 5.75¢ |
| Ton lots | 7.25¢ |
| Simanal (approx. 20% Si, 20% Mn, 20% Al), contract basis, f.o.b. Philo, Ohio, with freight not to exceed St. Louis rate allowed, per pound. | |
| Car lots | 8.00¢ |
| Ton lots | 8.75¢ |
| Less ton lots | 9.25¢ |

# Construction Steel . . .

*New York*

• • • **Even in the face of present retarding factors, F. W. Dodge Corp., fact-finding organization for the construction industry, estimates total dollar volume of new construction next year as 50 pct greater than in 1945 in the thirty-seven states east of the Rocky Mountains. The estimate for all construction in the 37 eastern states is $4,750,000,000 against $3,160,000,000 expected for 1945 on the basis of the record for the first ten months of this year.**

"In dollars, this volume is greater than that of any of the years immediately preceding the war," a statement issued by the corporation declares. "Taking cost increases into account, it represents a physical volume somewhere between that of 1939 and 1940. The percentage increase is about as high as the highest ever previously attained from one calendar year to the next," the estimate indicates.

The corporation anticipates an increase next year of 20 pct over 1945 in nonresidential construction, with substantial increases in public and religious buildings in this classification. An increase of 178 pct in residential construction, with a total next year of $1,350,000,000 in the eastern states is estimated. One- and two-family house construction will dominate residential building in 1946, the report states.

l demand is generally considered so large that it is likely to require construction, over an extended period, in larger amounts than in any previous peacetime years.

"There is plenty of factual evidence of a vast accumulated demand in the form of estimated shortages, contemplated and planned construction projects running into many billions of dollars, announced expansion and rehabilitation programs of industries, commercial organizations, utilities, state and local governments," the corporation points out.

At the same time, it declares three kinds of retarding factors exist to delay revival. These are increased costs and current confusion about market conditions, continuing government controls so far as prices and rents are concerned, and the growing pains of an industry called upon to expand its operations very suddenly.

"Many prospective investors receive a shock when presented with current estimates. For good reason these are frequently higher than published cost index numbers, which range for different types of structures from 25 to 35 pct over averages for 1939. Some contractors are refusing to make lump sum bids, prefering to take work on a cost-plus basis. Lump sum bids must necessarily include margins of safety to protect the contractor against uncertainties on prices, deliveries of materials, wages, work stoppages and labor efficiency," the statement says.

• • • **Fabricated steel awards** this week included the following:

**24,000 lineal ft.** tunnel liners, Chicago, South Side intercepting sewer contract No. 1, for Chicago Sanitary District, liners sold by Commercial Shearing & Stamping Co., Youngstown.

**2500 Tons,** Smith Bluff, Tex., bearing and sheet piling for Pure Oil Co. dock to Consolidated Steel Co., Orange, Tex., through Stone & Webster Engineering Co., Boston.

**1100 Tons,** Sallisaw, Okla., Oklahoma State Highway Department bridges, to Virginia Bridge Co., Roanoke, Va.

**500 Tons,** Fall River, Mass., generating plant for Montampo Electric Co. to American Bridge Co., Pittsburgh, through Stone & Webster Engineering Co., Boston.

**350 Tons,** Boston, Northwestern University unit to Harris Structural Steel Co.

**300 Tons,** El Paso, Tex., high pressure boiler installation for El Paso Electric Co. to Mosher Steel Co., Tex., through Stone & Webster Engineering Co., Boston.

**250 Tons,** Somerville, Mass., manufacturing plant for H. K. Porter Co., to Bethlehem Steel Co., Bethlehem, Pa.

**210 Tons.** Ransom, Pa., manufacturing building for National Paper Corp., to Bethlehem Steel Co., Bethlehem, Pa., through Sordoni Construction Co., contractors.

**200 Tons,** Gettysburg, Pa., building, Inductive Equipment Co., to William Christiansen Co., York, Pa., through R. S. Noonan, Inc., contractors.

• • • **Fabricated steel inquiries** this week were as follows:

**7800 Tons,** Chicago, Edison General Electric Co. manufacturing building. (Reported last week as 4000 tons.)

**5000 Tons,** Milwaukee, Schlitz Brewing Co. plant.

**1500 Tons,** Peoria, Pabst Brewing Co. building.

**1000 Tons,** Grand Coulee, Wash., Penstock coaster gates, U. S. Bureau of Reclamation.

**630 Tons,** Wasco Co., Ore., Mill Creek viaduct.

**560 Tons,** Various Locations, four manufacturing plants for International Furniture Co.

**440 Tons,** Conroe and Leonidas, Tex., beam spans, Texas State Highway Department.

**400 Tons,** Temple, Tex., beam span, Texas State Highway Department.

**300 Tons,** Cornelia, Ga., woodworking plant, International Furniture Co.

**287 Tons,** Madison, Wis., Soelch overhead bridge, Wisconsin Highway Commission.

**228 Tons,** Humboldt Co., Calif., Mad River bridge.

**142 Tons,** Portland, Ore., viaduct.

**121 Tons,** Auburn, Calif., East St. bridge.

**Reinforcing bar awards** this week included the following:

**3500 Tons,** Chicago, South Side intercepting sewer, contract No. 1 for Chicago Sanitary District, to Carnegie-Illinois Steel Corp., through S. A. Healy Co., contractor.

**175 Tons,** Jacksonville, Fla., Southern Bell Telephone & Telegraph to Truscon Steel Co., Youngstown, through Barge Thompson Contractor.

**165 Tons,** Cleveland, apartment building in Shaker Heights, to Truscon Steel Co., through Dolin Construction Co.

**145 Tons,** Bridgeport, Conn., F. W. Woolworth building to Truscon Steel Co., Youngstown, through K. R. Worcester & Co.

**100 Tons,** Norwich, Conn., Norwich Pharmacal Co., to Truscon Steel Co., through Austin Co., general contractor.

**Reinforcing bar inquiries** this week included the following:

**500 Tons,** Tyrone, Ky., power plant, Kentucky Utilities & Power Co.

**475 Tons,** Highland Park, Mich., Chrysler Corp. engineering building.

**307 Tons,** St. Bernard, Ohio, Proctor & Gamble plant addition.

**300 Tons,** Syracuse, N. Y., Carrier Corp., manufacturing building.

**300 Tons,** Dayton, Ohio, Loose-Wiles Co., new factory building.

**280 Tons,** Portland, Ore., viaduct.

**180 Tons,** Humboldt Co., Calif., Mad River bridge.

**175 Tons,** Paducah, Ky., U. S. Engineer Inquiry.

**130 Tons,** Pocahontas Co., Iowa, highway paving.

**121 Tons,** Dayton, Ohio, Terminal Cold Storage & Ice Co., new cold storage ice plant, B. G. Danies, Dayton, Ohio, contractor.

**116 Tons,** Solano Co., Calif., Midway-Dixon highway.

**110 Tons,** Kankakee, Ill., female veterans hospital.

**Sheet piling awards** this week included the following:

**3600 Tons,** Lorain, Ohio, Baltimore & Ohio RR. coal handling project, to Bethlehem Steel Co., Bethlehem, Pa.

**Sheet piling inquiries** this week included the following:

**1850 Tons,** San Diego, Calif., U. S. Navy destroyer base.

**1400 Tons,** Beaumont, Tex., including bearing piles, Pennsylvania Shipyards expansion.

**1100 Tons,** Chicago, bearing piles, Donnelley printing plant.

**800 Tons,** Charleston, S. C., steam power plant.

**450 Tons,** Various Texas Locations, bearing piles, Texas State Highway Department bridges.

## Canada Sees Us Best Copper Customer

*Toronto*

• • • **The dissolution of the Metals Control and the resignation of F. M. Connell, Toronto, as Metals Controller,** was announced by Munitions Minister Howe. All outstanding Metals Control orders are rescinded but price controls will be continued under Wartime Prices and Trade Board.

New financing arrangements in the way of loans to Great Britain by Canada and the United States are expected to result in renewed buying of Canadian base metals by British interests, and Canadian copper producing interests in London now are canvassing the trade with regard to future business. It is believed here that there is a good chance that a portion of United Kingdom needs will be drawn from Canada, perhaps sufficient to provide a better outlook for the disposal of 1946 copper from this country. Small amounts of Canadian zinc also are expected to be shipped to England and it is stated that lead is in heavy demand overseas and a market may be arranged for Canadian output.

In the past three or four months the copper situation in America also has changed and it now appears that a rather serious shortage is developing in steady oversupply as was earlier predicted. Canada continues to look to the United States as its best customer for its surplus copper. However, copper production here is not on as large a scale as it was during the war years and is not expected to reach that level during the next year or two.

## Canada Cuts Restrictions

*Ottawa*

• • • **All restrictions** on sale of motor cars and automobile tires may be removed by early spring, according to information from reliable sources here. Within a few months after the beginning of 1946 it is stated that practically all controls of the Dept. of Munitions and Supply will likely be abandoned. Announcement has just been made that all construction controls now have been abandoned, adding to the list of controls earlier abandoned, which include aircraft, chemicals, metals, steels, oil, ship repairs and salvage, and transport.

Price control, however, remains in force and is administered by Wartime Prices and Trade Board.

# Making Wedge Wire Screens of Stainless Steel

## Fabrication of Special Screens for Industrial Purposes Requires Stainless that is Uniform and Will Stand Severe Deformation - both Hot and Cold

Given a stainless steel which is completely uniform—the kind that the Rustless Iron and Steel Corporation makes—and an adequate amount of sales engineering, a comparatively small company can fabricate "difficult" products of stainless steel with less trouble than is encountered with most other materials. This is the experience of Wedge Wire Corporation of Cleveland, Ohio, makers of special screens for coal washing and for foods and chemicals.

Machinery for making Wedge Wire screening was brought to this country from England only a few years ago. The unique product made with this equipment is attracting wide interest because of several advantages over ordinary wire mesh claimed for certain applications. The screen-wire itself is formed into wedge or other shapes (see next page) to produce controlled openings through which the liquid and fines being screened can pass. The fact that the surface is almost flat is one reason why Wedge Wire is less apt to clog and thus gives greater production than ordinary screen. The flared contour of the escape passage is also said to produce a desirable orifice and minimize clogging. Furthermore, of fine screening, Wedge Wire screens are more rigid than ordinary fine mesh.

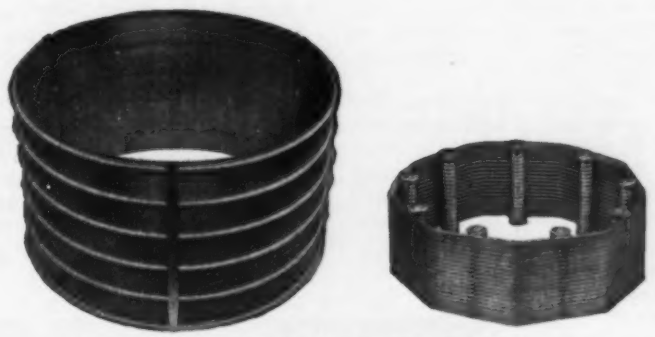
Wedge Wire screens must be made to close tolerances. To achieve a high degree of control of screening the wire-to-wire openings must be held to plus or minus .002", which means holding the top widths of the wires themselves to plus or minus .001".

The assembly of the screen calls for forming loops at evenly spaced intervals in its wire members and passing tie-rods through the loops of several consecutive wires to form a screen which is rigid and in exact alignment. The loops must mate where the wires cross the tie-rods, to form tight and clog-proof joints. And the inside diameters of the loops must have a close but not binding fit on the tie-rods to form an assembly which is free from play between members but also is free from strain. All of this calls for stainless steels which will deform to exact tolerances under the dies which form the wire and loop shapes, and which will not spring back or creep appreciably after being deformed.

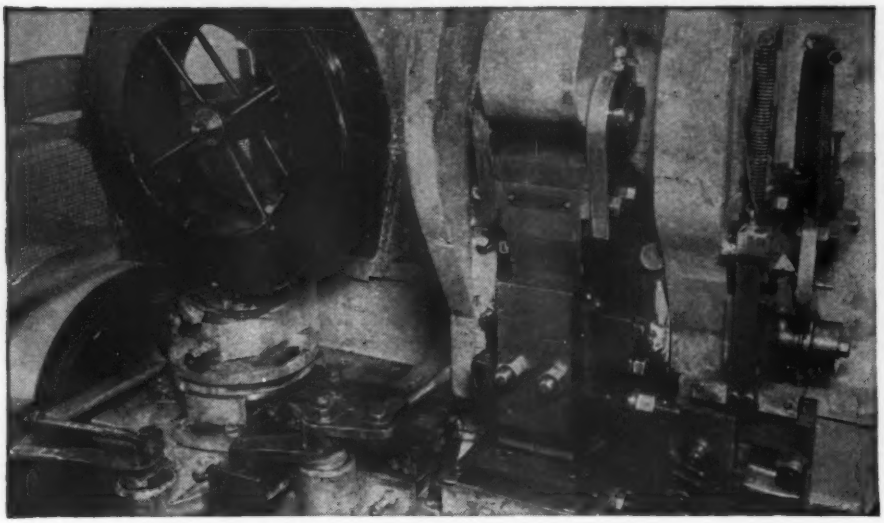
In service the screens are for dewatering, filtering, washing, drying and the separation of materials. A few of the numerous places where they may be placed are in chutes, hoppers, shakers, sluices, drag conveyors and baskets in stationary or moving frames. They are also formed into circular sections for suction filters, centrifugal and rotary screens. While retaining their true form and stiffness under such service, the screens must handle products which may be erosive, corrosive, or both. Wedge Wire screens find wide use in coal, processing plants, chemical plants, food plants, soy-bean and other oil plants, limestone plants and the like. It is because of superior structural and fatigue strength as well as resistance to both erosion and corrosion that stainless steel is used. Stainless steel not only is longer-lived in service, but with its superior mechanical properties increases the kind and amount of stress to which the screens can be subjected and thereby widens their fields of usefulness.

Rustless 17 and 18-12-3Mo, stainless steel Types 430 and 316, are used; Type 430 is preferred for coal plants and Type 316 for chemical and food plants. The material is bought with a thin uniform electrodeposited copper coating, the copper acting as a die lubricant when forming the wires and loops. Generally the copper is not removed since it in no way affects either the performance or the durability of the screen. If it is necessary to remove the copper, this is easily done by dipping in a 10% solution of Nitric Acid. This dissolves the copper but does not affect the stainless.

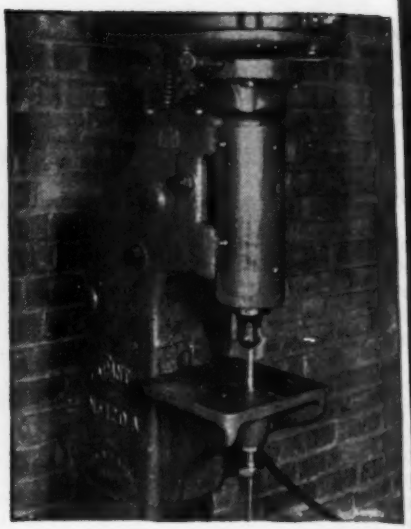
Production operations include straightening the round wire which has been received in coils; cold forming the loops and cold pressing into the wedge cross section or other shaped members, cold heading one end of each tie-rod, passing the tie-rods through the loops for preliminary assembly, squeezing the wires together along the tie-rods to get the final tight and rigid assembly,



*Two Types of Stainless Steel Wedge Wire Circular Screens.*



*The working Area of the Forming Machine.*



*Cold heading on a Conventional Type Rivetter.*

cutting off the tie-rods to length, and hot heading the open end of the tie-rods to hold the wires in place.

Stainless steel shows definite advantages at the first or straightening operation. Straightening is done in a conventional double bending machine, with the wire being wound on special reels to fit the forming machine after the wire has been straightened. One of the purposes of straightening is to take the kinks out of the wire which resulted from possible rough handling in shipment. Once out of stainless these bends do not return as they sometimes do in other metals of which these screens can be made. That is, the proper kind and temper of stainless steel is more readily straightened, and does not spring back. This reduces fabricating costs, since bends in the wire result in stoppages at the forming machine and sometimes in broken dies.

The forming machine loops the wire, forms its cross sections to true and accurate contours, and cuts it to the length needed for the screen, all by fully automatic operations.

The first operation in this machine is forming the loop by winding the wire once around a die pin. Here the complete uniformity of Rustless stainless steel first shows its value. If all of the shipments of wire passing through this process were not alike in both size and temper, then some loops would bind too tightly on the pin so the pin could not be withdrawn to clear them, some would wind too loosely and result in oversize loops which would need special diameter tie-rods for assembly, and some might spring back after winding so that subsequent forming operations would be impossible. With Rustless stainless steel there never is any trouble.

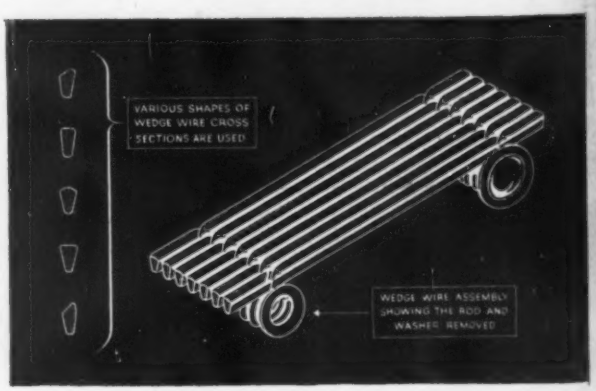
The round wire with loops in place passes to the forming dies. This forming operation is severe. It must produce flat surfaces, concave ones, or convex ones which possess two entirely different radii than those of the original wire, hold one or more dimensions to plus or minus .001", and deform the wire through about one-third of its original cross-sectional area. The loops also must receive new cross-sectional forms, and these are different from those of the straight sections of the wire. The fact that all this can be done on machines which have only ordinary press actions and which use dies made of ordinary die steels, should relieve many a metal fabricator of the idea the stainless steels are necessarily difficult to work.

Severe forming operations like these cause the metal to flow lengthwise as well as crosswise of the wire. This lengthens the distances between the already spaced and formed loops. Here the complete uniformity of Rustless stainless steel wire provides a second advantage.

Any lack of uniformity in the wire will change the distances which these loops move apart under the forming. Resetting of the machine motions can compensate for some variations in the loop spacings, but any such variations result in increased or decreased over-all lengths of the finished wires since the automatic cut-off mechanism is actuated by a counting mechanism which trips the cut-off after a preset number of strokes of the forming ram and not by anything which takes lineal measurements. The finished wires must come to correct lengths or (if not too bad) be cut to length or else be rejected. Any corrective operations whatever mean loss of machine time and of labor time as well as scrapping materials upon which expensive operations have been performed. With uniform Rustless Stainless Steels these troubles are not encountered.

Completely uniform materials also are important at the cut-off. A steel that is too hard will snap off under the cut-off tool, this tendency being enhanced by the amount of work hardening which the material can receive under the previous severe forming. A material too soft can mush or deform here. Either condition requires a corrective operation if the finished wire is to be salvaged. Completely uniform and correct material avoids this added expense.

Finished Wedge wires run automatically into a gutter of a flat,



etal-topped table. They are transrred to the table top, their loops e aligned, and just enough steel sembly guide pins to hold the ires in alignment are run through few rows of the loops. Then the ires are transferred to the assemy department.

Primary operation of assembly is cut stainless steel tie-rods into ngths a few inches longer than the tended widths of the finished reens. This is done in an ordinary wer hack saw.

One end of each piece is cold upset form a head against which the ire loops can bear. This upsetting done with an ordinary air hamer or in a conventional-type rivetinning machine. This company ever has had any trouble with upting operations on Rustless Stainss Steels.

The Wedge Wire loops are held to lose but not extremely fine tolernces. Originally they were held to lus or minus .0015″; an over-all olerance of .003″. But when experince proved that the inside diamers of the loops were more likely come undersize than oversize, due wear reducing size of the windg pin, the tie-rod dimensions were hanged to plus .000″ minus .003″, hus bringing all of the tolerance the minus side.

The fit of the loops on the tie-rods anges from snug to light press ategories, but never a force fit or drive fit since the loops are desired to be supported but not strained and not to be given any tendency to cock or to deform during he assembly operations. The rods, hen, are inserted by hand, the assembly guide pins which had been nserted at the forming machine being withdrawn.

The loose assembly is moved over so the cold-headed rod ends bear against a raised edge of the assembly table. This raised edge is to serve as one jaw of a clamp. The opposite jaw is placed against the free side of the assembly and is tightened toward the raised edge of the table. Tightening the loops together leaves an excess end of tie-rod protruding from the side. This is cut off, an adaptation of a conventional portable pneumatic shear being used for the purpose. Complete uniformity of the rod stock is important to this operation to avoid deformation of the rod ends.

Enough of the excess end is left for final hot upsetting. A stainless-steel washer is placed on this end; the end is quickly raised to red heat with an acetylene flame, and the final hot upsetting is done with a portable compressed-air hammer of conventional type. Rapid air cooling is not detrimental to Types 430 or 316 for Wedge Wire applications.

A variation of this assembly procedure is used when the screen is to be curved to be used in a centrifugal or other machine. The "top" surface of the screen can be arranged for the screened material to pass either from the outside to the inside or from the inside to the outside of the screen cylinder. In either case, it is the tie-rods and not the screen wires which must be bent. The bending is done before assembly, the rod-end usually being threaded so that nuts can hold the meeting edges of the screen to a joining member (usually a channel iron) which completes the wall of the cylinder.

A still later variation is to make the screen flat and then curve the rods in a bending brake. Mechanical techniques for this are being developed by a user of the screens but are being kept unpublicized. By such methods the finished screens can be treated as semi-finished raw materials to be formed into many special shapes for better adaptation to special purposes.

The Wedge Wire Corporation and its customers, then, are able to severely deform and re-deform stainless steels with no special or extra careful handling, no heat-treatments of any kind, no metal cleaning or other "after processes" to prevent corrosion, and almost no manufacturing rejects. They are doing no more than handle it in the offhand manner that would be accorded to "ordinary" metals. They are handling it in a trouble-free way that is made possible first by the excellent fabrication and mechanical properties of stainless steel in general, and second by the complete uniformities of Rustless Stainless Steels. And of all the factors which permit this simplicity of methods, uniformity is by far the most important.

The End.

Rustless engineers are glad to work closely wtih those who fabricate stainless steels into industrial equipment or consumer goods. Their cooperation has been invaluable to many firms, which is natural enough since Rustless has never done anything in its entire history except produce, study, learn about stainless, how to machine, forge, heat treat, electropolish, blacken, otherwise work with stainless easily and economically. Much of the Rustless knowledge has been put into printed form. Write for helpful new chart entitled "Trade Names of Stainless Steels."


*Final hot upsetting of Rod Ends.*



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*Producing* STAINLESS STEELS *Exclusively*

**RUSTLESS IRON AND STEEL CORPORATION**

BALTIMORE 13, MARYLAND

## W. B. Pierce Heads New Alloy Sales Program

*Pittsburgh*

• • • **Development work** on new applications of stainless steel and other alloy steel products is to rank high on the Allegheny Ludlum Steel Corp. postwar program.

W. B. Pierce

Concurrently with the formation of a sales development department, to integrate and intensify product application and new development activities, the company announced the appointment of W. B. Pierce to head the department. Under his direction, a staff of technically trained engineers will assist manufacturers in the solution of problems involving applications of stainless steel and related alloys.

Mr. Pierce, widely known to the stainless steel industry and consumer trade, had been with the Rustless Iron & Steel Corp., Baltimore, since 1937 as manager of market development. He previously was associated with the development division of the Aluminum Co. of America, Pittsburgh and New Kensington, Pa.

Mr. Pierce was chief of the stainless steel branch of the War Production Board during the period from January, 1945, until after V-J Day.

## India Pig Iron Price Higher Than Prewar

*New York*

• • • **Mid-September prices** of pig iron at Calcutta range from 104 rupees for a gross ton of No. 1 foundry to 98 rupees for No. 4, it has been learned from the India Government Trade Commissioner here. These prices have not varied since early 1944.

At an exchange rate of 30.3c per rupee, the price in U. S. dollars of India pig iron ranges from $31.51 to $29.69. Considering the high cost of ocean transportation between India and the United States, there is little likelihood of importation of India pig iron into this country without some modification of prices or exchange rates.

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## ARISTOLOY STEELS

**COPPERWELD STEEL COMPANY • WARREN, OHIO**

**ARISTOLOY STEEL INTERNATIONAL COMPANY**
EXPORT DIVISION • 815 FIFTEENTH ST., N.W. • WASHINGTON, D. C.

STANDARD STRUCTURAL ALLOY STEELS
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ALLOY TOOL STEELS • STAINLESS STEELS
NITRALLOY STEELS • SPECIALTY STEELS


## World's Most Powerful Locomotive Delivered

*Philadelphia*

• • • **The most powerful** diesel locomotive in one unit was unveiled Dec. 3, at the Eddystone, Pa., plant of the Baldwin Locomotive Works. It generates 3000 hp from two supercharged engines in one cab. The locomotive was built by Baldwin for the Seaboard Air Line Railway.

Although capable of a speed of 120 mph, the maximum speed restriction of the new locomotive is 85 mph. It will be put into service by the Seaboard line in heavy, fast freight runs to carry fresh fruits and vegetables from Florida to the northern markets. Because of its speed and power it is expected that tree-ripened fruits can be carried to market quickly and in huge quantities.

The new diesel-electric locomotive is distinctive in that the two 1500 hp engines are in one unit. Heretofore, in locomotives of more than 2000 hp, it has been necessary to provide more than one unit. In use, these two or more units then are coupled together to give the needed power, a practice common with conventional steam locomotives to form a "double header."

There are several distinct advantages in having all this power in one unit. One of the most important is that the overall length of the locomotive is less than with the same amount of power in two or more units. This makes it possible for the locomotive to be turned more easily. Not only is the one-unit diesel shorter, but its design permits a lower weight on each wheel, an important consideration. The locomotive has 12 axles, eight of which are motor driven.

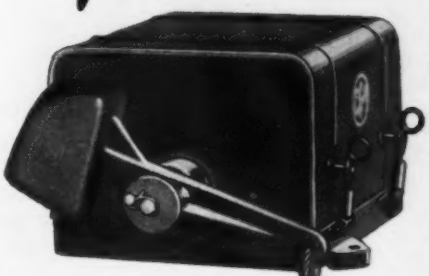
The two diesel engines have eight cylinders in line. Normally, these engines would deliver 1000 hp each, but the addition of turbo-superchargers adds somewhat more than 500 hp more to each engine. These engines drive generators that furnish the electric power to the wheel motors. Each of these motors drives an axle, and thus, two wheels.

Another innovation in the construction of the locomotives has been the use of running gear made up of articulated trucks. With this type of construction the engine pulls its cars through the running gear itself rather than pulling them through the body or cab. Baldwin has been able to redesign the running gear of the

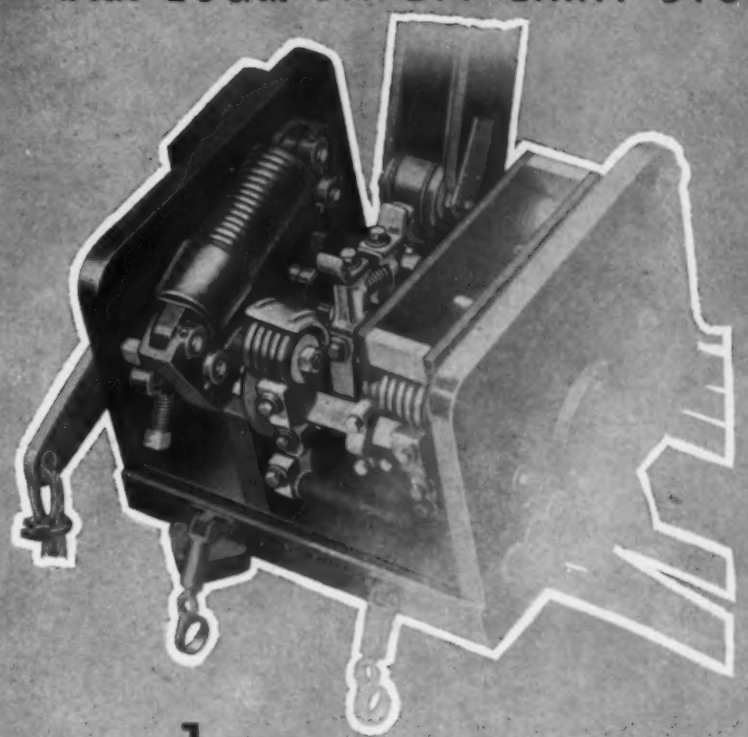
# *Improved Protection for* CRANE HOISTS

## AGAINST OVERTRAVEL

## *with* EC&M *SAFETY LIMIT STOP*



No. 20 Youngstown size; 100 H.P.; 230 volts; single motor rating. Also available in duplex style.



**1** **No lubrication required**—Oilite bearings (with super-oilite on main bearings) are self-lubricating and long-lived. This means that the costly and sometimes forgotten item of lubricating maintenance is eliminated forever.

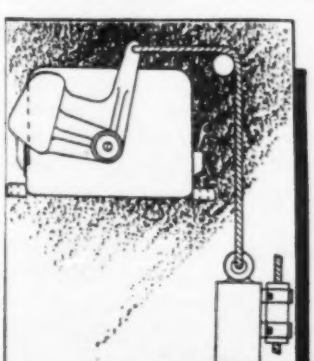
**2** **Compact—easy to mount**—Reduced, overall dimensions—three convenient mounting holes, and but one suspended weight.

**3** **Small reset travel**—High crane lifts are possible with the No. 20 because the amount of travel between "run" and "tripped" positions has been kept at a minimum.

**4** **High interrupting capacity**—Two normally open and two normally closed contacts, mechanically interlocked and with wide, vertical opening, always assure positive interruption of the hoist motor current.

This No. 20 Youngstown Limit Stop can be easily installed on new or old cranes, either alternating or direct current operated.

Folder 1035 gives complete description. Write for your copy.



**Optional Style**—with offset weighted-arm which eliminates intermediate sheaves when Stop is not mounted directly over crane hook-block.

**A Crane Without a Youngstown Is as RISKY as a Boiler Without a Safety Valve**

**THE ELECTRIC CONTROLLER & MFG. CO.**

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conventional steam locomotive and use it for the new diesel, allowing the cab to "take a ride" while the trucks do the work. All other diesels use the trolley-car type of running gear. The comparatively long wheelbase of the locomotive also gives a smoother, steadier ride especially on a straight track where it is most important and more difficult to achieve.

## Army Surplus Property Disposition Reported Paper Work Problem

*Washington*

• • • **Out of $3 billion** worth of surplus property declared to disposal agencies since June 1944, only about $800 million has been removed from War. Dept. storage facilities, Undersecretary of War Kenneth C. Royall told the Mead (Senate) War Investigating Committee on Nov. 28. This figure does not include surplus aircraft valued at $4 billion.

Although the War Dept. and the disposal agencies have cooperated in an attempt to move these surpluses promptly, Mr. Royall stated that out of capital and producers goods declarations totalling $1586 million, property totalling $1029 million still remained in the custody of the War Dept. Also, out of consumer goods declarations totalling $1264 since June 1944, $993 million worth remained to be moved as of Oct. 31.

Pointing out that the burden of storing and handling of these surpluses is tremendous in terms of space, manpower, and expense, the Undersecretary declared that it was also a source of unjustifiable criticism of the Department. He also made it clear that he was in no way disparaging the efforts of the disposal agencies which are making progress in the face of many discouraging obstacles. The record-keeping job alone, he said, is very time-consuming.

Final determination of the strategic reserve needs of the Army based on the anticipated size of the postwar army are being formulated by a special board headed by Lt. Gen. Courtney H. Hodges. Preliminary recommendations are expected to be made by the board very shortly. The size of the strategic reserve, it was pointed out, will ultimately depend on Congressional action determining the actual size of the armed forces.

# JALLOY STEEL

## NEW, TOUGH, DUCTILE, DURABLE. DEVELOPED FOR DYNAMIC JOBS

Jalloy is a *new* steel developed by J & L for application where dynamic forces are involved in the job to be done. It was evolved from a steel produced to take hard knocks and rough usage in the deep-drilling operations of the petroleum industry. In the war emergency this steel, through intensified research, was adapted quickly to tank armor . . . . and you know how magnificently U. S. tanks withstood terrific punishment in the victorious campaigns of Africa, Europe and the Pacific.

Where steel must be in action, where it has to meet stresses, heavy shocks, and resist the forces of abrasion and weather — there Jalloy, the tank armor veteran, looms serviceably for you on the industrial horizon.

Although a giant for strength, Jalloy is ductile and tough. It makes possible radical changes in design affording very substantial reductions in weight of many products. Its welding, forming and forging qualities are excellent. It responds to heat treatment with exceptional uniformity of physical properties—it performs well even at sub-zero temperatures.

Jalloy is a working steel; a steel for use with power and action on the big, tough, dynamic jobs that must be done in America soon and fast.

## A WORKING STEEL

**Plow shares of tank armor,** instead of swords, are modern symbol of reconversion of steel from war to peace. Jalloy, produced on the famous J&L formula for tank armor, is a hard-working new steel being adopted by plow makers for its toughness, durability and workability. Farming today calls for tractor-operated plows that can turn as many as 5 furrows at a time (see sketch).

**Ordnance for Revolution** produced by iron works in Colonies consisted primarily of cast iron cannon and cannon balls.

**Powerful blades of bulldozers** building new highways, leveling land for new municipal airports, grading for great irrigation and flood control projects are being made of the tough, unbeatable J&L steel called Jalloy.

**Alloy steel process discovered** by Michael Faraday (England, 1791-1867), waited 50 years for practical application until Sir Robert A. Hadfield invented manganese steel, adding great toughness and strength to alloy and carbon steels, when heat treated.

**Before steel,** the opening of highways, erection of bridges and buildings, development of oil, lumber and other resources were small, local enterprises. Only after steel became available in abundance in America in the 1890's did such projects become possible on today's vast, nation-wide scale.

**Mt. Hope iron ore mine** in New Jersey, first operated in 1715, is still producing.

**Heat treated plates** from Jalloy are used in abrasion resisting applications where its longer life reduces maintenance costs.

**Crucible steel was invented 1730** in England by Benjamin Huntsman.

**Heavy duty shafting** must withstand repeated shocks and stresses. Jalloy steel has the high physical and impact strength for such jobs.

**Big steam shovel buckets** that can dig up truckload of earth and rock in one bite must be made of toughest, hardest-wearing alloy steel, such as Jalloy.

**Open hearth furnace,** greatest producer of steel in large tonnages at low cost, was invented in England, 1861, by C. W. Siemens.

**Today steel is years ahead** in metallurgical research and development. Satisfying the steel-hungry public; putting steel to work in new ways—this is the job today that spells employment, progress and enjoyment of living on a new, high level of convenience and contentment.

**Benedict Arnold** dug Adirondack iron ore in 1775 to get iron for cannon, chains, anchors for his fleet of warships on Lake Champlain. Today J&L is mining iron ore in the Adirondacks.

**JONES & LAUGHLIN STEEL CORPORATION**

PITTSBURGH, PENNSYLVANIA

J&L STEEL

LIGHTER, STRONGER, CONTROLLED QUALITY STEELS

## A. O. Smith Reports $4.5 Million Profit

*Milwaukee*

• • • **The A. O. Smith Corp.** showed a net profit of $4,535,000 for the fiscal year ending July 31, 1945. This compared with $4,355,000 for the same 1944 period after renegotiation of war contracts. The 1945 figure includes an estimated provision of $25,788,000 for taxes and $2,400,000 deduction for renegotiation.

The company reported net sales of $194,464,000, in contrast to $178,112,000 in the 1944 fiscal period. Current assets increased to $75,766,000 in 1945, including cash of $19,871,000, compared with the previous figures of $71,450,000 and $12,784,000, respectively. Current liabilities this year were $20,680,000, compared with $17,551,000 in the previous year.

In its report to stockholders, the company said: Its home appliance division is operating at capacity; its pressure vessel division has a relatively high rate of production; production will start this month on glass lined steel storage tanks for breweries, and the company will reenter the steel beer barrel production field early next year.

## Surplus Government Red Tape Hinders Sales

*Cincinnati*

• • • **While surplus** government machine tools have worried manufacturers some sales agents indicate that red tape in making purchases is such as to deter prospects. Complaints of prospects indicate that the time involved from original bid to completed purchase is so long that customers cannot wait to receive the equipment. Some also have complained that records of machines available are sometimes so indefinite that identification of the machines is almost impossible. Accordingly some sales representatives feel that with users desiring prompt delivery direct orders are more likely to result. New business continues to be fair but peacetime influences are in evidence in the slower pace of orders. Strikes and threatened labor disturbances of course are tending to unsettle the market.

## *High Amortization Puts Pittsburgh Steel in Red*

*Pittsburgh*

• • • **The Pittsburgh Steel** Co., reported a net loss of $1,274,752 for the quarter ended Sept. 30, 1945, and a net loss of $652,292 for the first nine months of this year. The heavy losses were accounted for by the deduction of accelerated amortization totaling $4,564,702 in accordance with the proclamation of the President on Sept. 29, 1945. The estimated refundable portion of federal and state income tax for prior years, arising from accelerated amortization and carry back of 1945 net operating losses and unused excess profits tax credits for the third quarter totaled $4,109,400 and for the nine months amounted to $3,600,000. The company showed a net operating loss of $819,451 for the quarter and a net operating profit of $312,408 for the nine months.

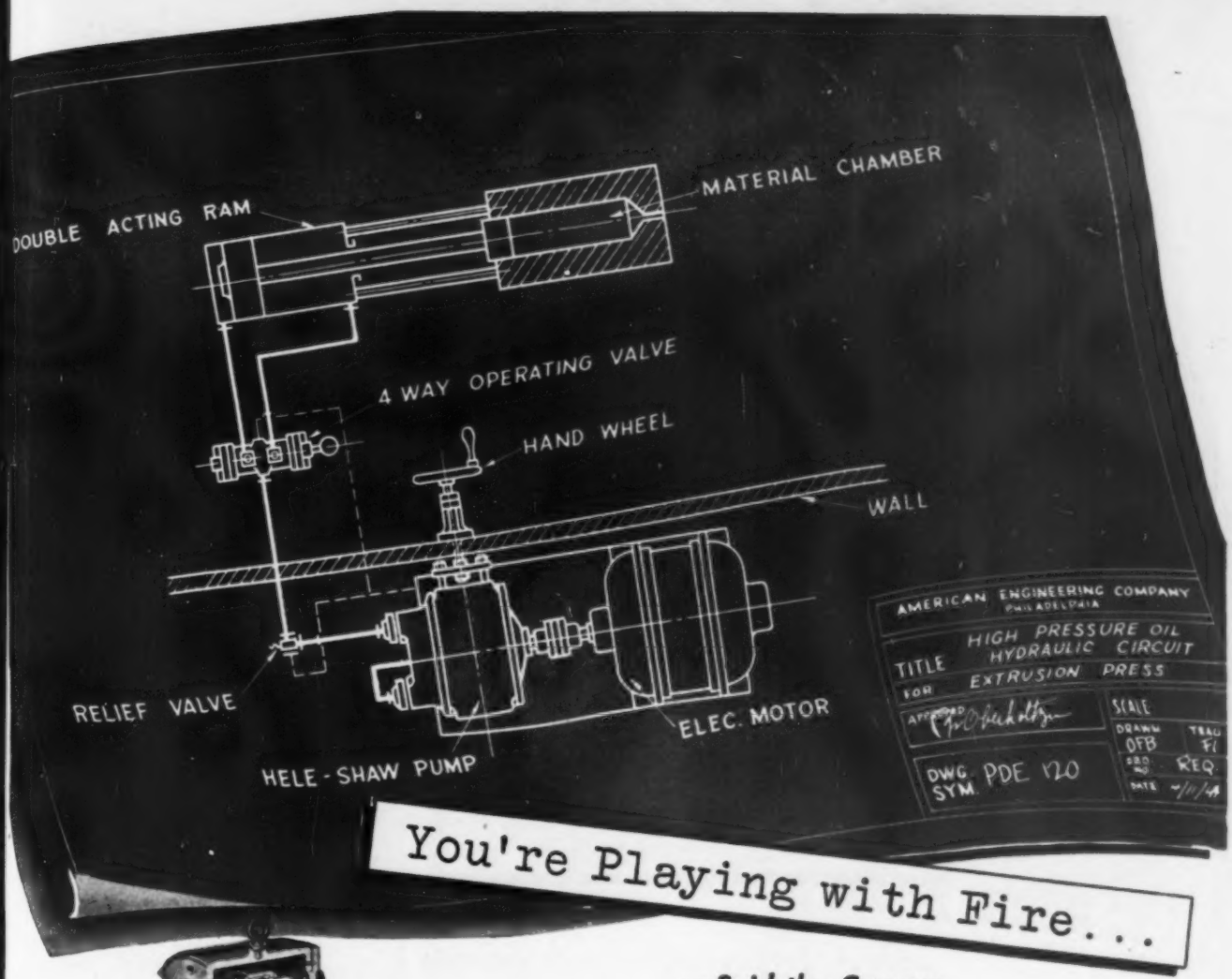
If the company had not elected to shorten the period of amortization, the net profit would have been computed by giving effect to $452,000 tax refunds arising from the carry back of unused excess profits tax credits and the elimination in the third quarter of the tax provision of $509,400 made for the first half of the year. This would have resulted in a net profit for the company of $141,949 for the quarter ended Sept. 30, 1945, and a net profit of $764,408 for the nine months ended Sept. 30, 1945.

## *AISI Group Proposes Simplified Practice*

*Washington*

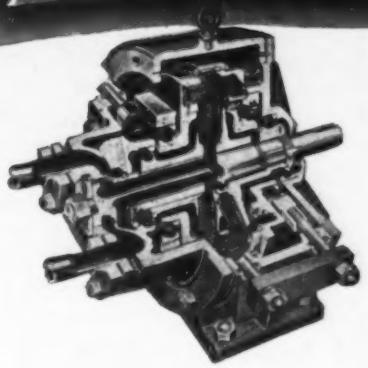
• • • **A voluntary simplified** practice recommendation for hot-rolled carbon-steel bars and bar-size shapes (billet steel mill practice), as proposed by the technical committee on carbon steel bars, of the American Iron and Steel Institute, has been submitted to all interests, for their comment, acceptance as proposed, or both, according to an announcement of the division of simplified practice of the National Bureau of Standards.

The proposal covers the nominal sizes of; rounds, squares, round-corner squares, hexagons, half-rounds, ovals, half ovals, bar-sizes of angles, channels and tees.




# You're Playing with Fire...

***—Said the Censors***



THE HELE-SHAW

*Fluid Power*

**PUMP**

**OTHER Æ PRODUCTS:**
**TAYLOR AND Æ PERFECT SPREAD STOKERS, MARINE DECK AUXILIARIES, LO-HED HOISTS DIAMOND FACE GRINDERS**

"Sorry", said the censors, hush-hushing the details of this application, "you're playing with fire." And we were! But this much they let us tell:

In the process of extruding a certain highly combustible war material, the danger of fire is ever-present. For safety's sake the extrusion chamber must therefore be separated from its source of power. Hele-Shaw Fluid Power (oil under pressure) was chosen because the Hele-Shaw Pump could be located safely behind a brick wall. The Hele-Shaw Pump with its constant-speed motor supplies "piped power" to the extruding mechanism. Simple handwheel-adjustment of the pump flow provides infinite extruding speed variations.

Variable discharge, ease of control, and ability to isolate the Hele-Shaw Pump from dangerous atmospheres are only a few of the many advantages for Hele-Shaw Fluid Power. Why not think of Hele-Shaw Fluid Power as *your* next motivating force? We'll be glad to answer your questions . . . and give engineering assistance.

**AMERICAN ENGINEERING COMPANY**

**2433 ARAMINGO AVENUE, PHILADELPHIA 25, PA.**

## ASME Presents Honors And Awards at Annual Meeting in New York

*New York*

• • • **The American Society** of Mechanical Engineers, holding its four-day annual meeting here, recently conferred its annual honors and awards for distinguished work in engineering, education, research or literature. More than 1500 members and guests attended.

The ASME Medal, the society's highest honor, this year was awarded to Dr. William Frederick Durand, professor emeritus of mechanical engineering, Stanford University, Calif. This award, given for distinguished service in engineering and science, was presented in recognition of his work in forwarding the design and application of principles of jet propulsion and for his leadership of the division of engineering and industrial research, National Research Council, of which he is the former chairman.

The Holly Medal was awarded to Dr. Sanford Alexander Moss, General Electric engineer of West Lynn, Mass., for his many contributions to the development and application of turbo-superchargers to internal combustion engines.

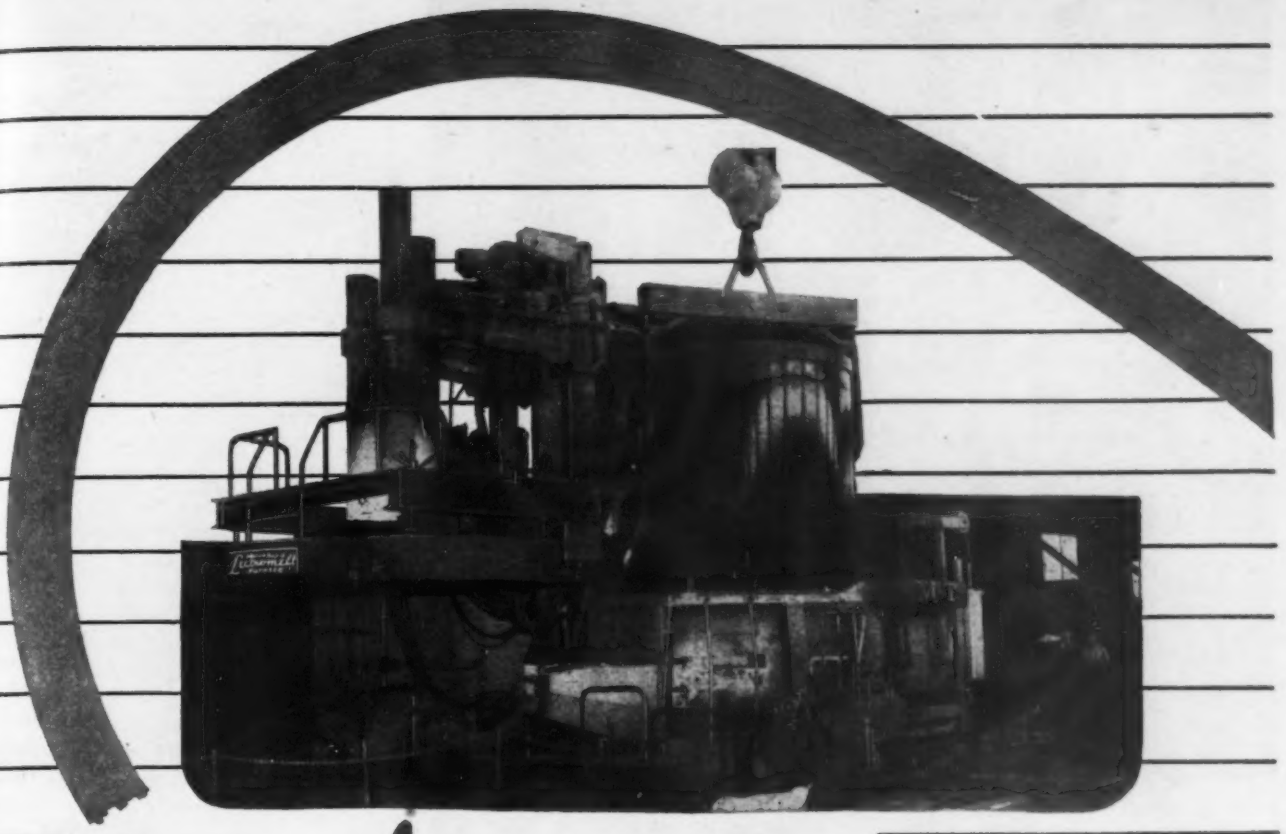
Joseph M. Juran, professor of and chairman of the department of administrative engineering, New York University, was recognized for his contribution to the problem of quality control in mass production, and other writings, with the Worcester Reed Warner Medal.

William Julian King of the Fuels Div., Battelle Memorial Institute, Columbus, Ohio, was presented with the Melville Prize Medal for an original work, for his paper, "The Unwritten Laws of Engineering."

A California engineer, Bruce Eugene Del Mar of Santa Monica, received the junior award for his paper: "Presentation of Centrifugal Compressor Performance in Terms of Non-Dimensional Relationship."

Jack Drandell of Milwaukee, Wis. won the Charles T. Main Award, for his paper: "Engineering in the New South."

The undergraduate student award was presented to Ensign John Waldemar Erickson, of Chicago, for his paper: "Increasing the Efficiency of Gas Turbines."



# Features OF ADVANTAGE IN MOORE RAPID Lectromelt FURNACES

Top Charging converts important blocks of dead time into production time.

Perfect control of heat results in steels and irons of high excellence, eliminates uncertainty in securing any desired analysis.

Any steel or iron product that can be made by any other melting process can be made by Lectromelt, under better control and of superior quality.

Plant records establish the fact of important reduction in power, electrode and refractories costs.

Simple mechanisms assure uninterrupted operation.

Lectromelt Top-Charge capacities range from 100 tons down to 250 pounds. Illustrated is a size MT-25 ton Lectromelt being charged with a drop bottom charging bucket.

Literature on request.

**PITTSBURGH LECTROMELT FURNACE CORPORATION**

**PITTSBURGH,..30..PENNA.**

## *Pittsburgh Coal Merger Forms Nation's Largest Bituminous Producer*

***Pittsburgh***

• • • **The newly merged** Pittsburgh Consolidation Coal Co. formally was organized Nov. 2 at a meeting of its 15-man board of directors, headed by Robert C. Hill of New York, chairman, and George H. Love of Pittsburgh, president. A. K. Oliver of Pittsburgh was named chairman of the finance committee; James B. Morrow, Pittsburgh, 1st vice-president; George W. Kratz, vice-president, and C. E. Beachley, secretary and treasurer.

Pittsburgh Consolidation becomes the nation's largest commercial producer of bituminous coal. It has assets of more than $100 million with a net working capital of about $29 million after making liberal allowance for objecting Pittsburgh preferred stockholders accepting the cash offer of $100 a share.

The company has 43 mines in Pennsylvania, West Virginia, and Kentucky, approximately 1.3 billion tons of unmined coal, 16,000 employees, and a current production rate of 20 million tons annually, with lessees producing an additional 6 million tons annually.

Two wholly owned subsidiaries have been organized to operate the properties formerly held by Pittsburgh Coal Co. and Consolidation Coal Co. The subsidiaries will be conducted under a basic policy of placing responsibility for operations of all properties upon the people at the actual scene.

James B. Morrow will be president of the new Pittsburgh Coal Co. and will have complete responsibility for the operations of all of his old company's properties. This company will have about 115,000 acres of land with an estimated 775 million tons of unmined coal.

The new Consolidation Coal Co. will operate the properties of the old company with the same management and personnel. It will have about 113,000 acres of land and about 600 million tons of unmined coal.

The combined Pittsburgh and Consolidation companies had assets of about $162 million. However, the plan of merger empowered the new board to create a reserve to reduce the carrying values of the properties. Immediate consideration is being given this problem and present estimates indicate the reserve might not


# Have You Heard the Latest About OVERHEAD CRANES?

● Progress has been rapid during the past few years. And if you haven't kept tab on the important P&H advancements, be sure to investigate them before you buy your next crane.

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*Established in 1884*

exceed $62 million, which will give the new company assets roughly of $100 million.

Pittsburgh Consolidation Coal Co. has extensive investments in companies operating in various fields associated with coal production, such as railroads, river and lake transportation, merchandising and extensive dock facilities on the Great Lakes. No change is being made in the management or personnel of these subsidiaries.

This new merger has been a long time in formulation, mainly because of minority stockholders' objections. Stockholders' suits were threatened and the officers of the company, with the directors, finally worked out a plan whereby objecting preferred stockholders would be paid $100 a share for each share of stock that they held.

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## *Committees Appointed By Machinery Dealers*

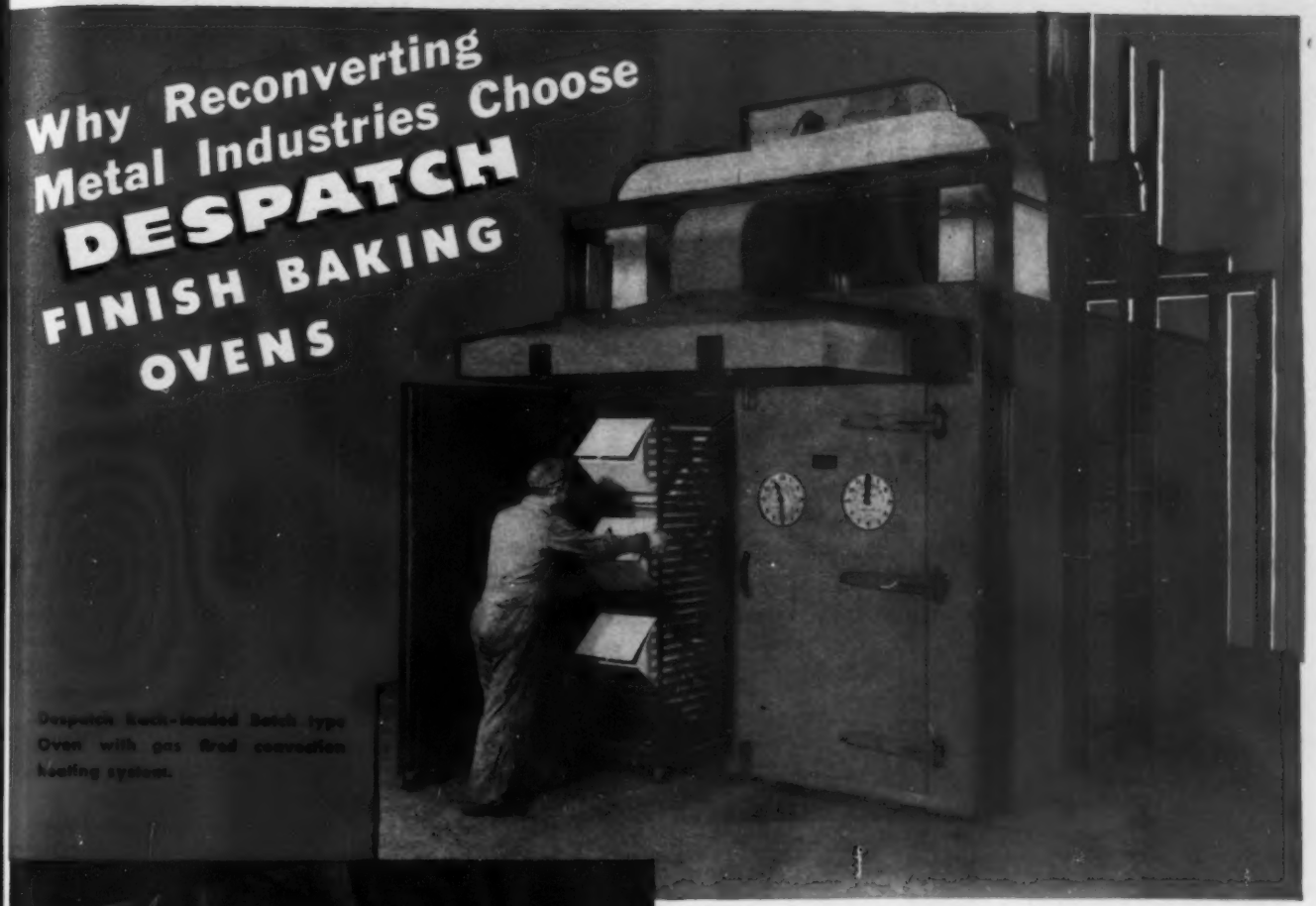
*Chicago*

• • • **Chairmen for standing** committees of the Machinery Dealers National Assn. have been appointed by Harvey Goldman, national president.

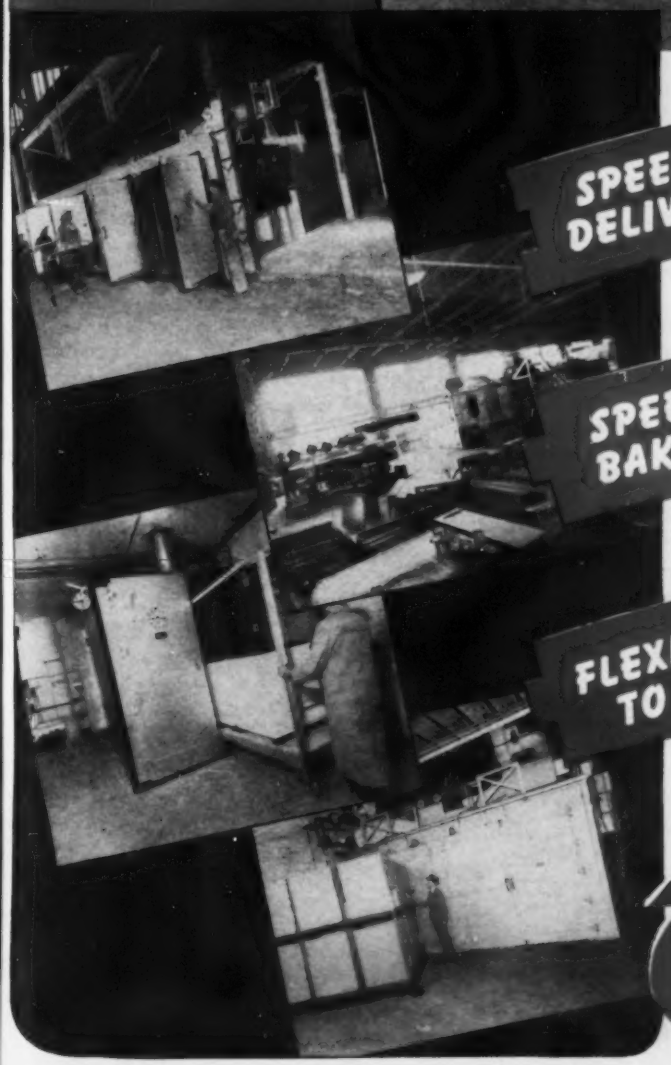
Reports of the committees will be received by the board of directors of the association and used as a basis for establishing policy. Local committees appointed by chapter chairmen in each community will submit their reports to the national committees, which are made up of local committee chairmen.

Committee membership is as follows: Ways and means committee, Louis Botwinik, chairman; A. B. Gellman, J. Lee Hackett, Richard Nathans, Morrison Nemrod and Nate Lee. Budget committee, Charles L. McDonald, chairman; Max Segal, Albert J. Ott, Harry Burstein, Frank Daley and Harry Hyman. Membership committee, Samuel Danits, chairman; Frank J. Lumney, William L. Howarth, Myron Segal, Richard Nathans and William DeSenti. Industry affairs committee, Ray Vine, chairman; William Sharpe, Louis Botwinik, S. S. Sherman and Sam Wiener. Public relations committee, Sidney Kriser, chairman; Harold Blumberg, J. E. Middleton, J. G. McCutcheon, and Benjamin D. Brooks. Meetings, entertainment and conventions, Frank J. Lumney, chairman; Joe Hurwitz, John Green, E. V. Shugart, J. E. McCrudden, and Maxwell Kallor.

# Why Reconverting Metal Industries Choose DESPATCH FINISH BAKING OVENS



Despatch Back-loaded Batch type Oven with gas fired convection heating system.




● Reconverting industries, needing fast deliveries of new equipment, can now take advantage of the speedier production of Despatch Batch Type Ovens.

Two new plant additions, large engineering staff, ample manufacturing and production facilities, plus 43 years of experience—these assure you of *faster* delivery of Despatch ovens.

**FAST DELIVERY OF NEW MODELS**

These are not prewar ovens; they're 1946 models with many new, exclusive Despatch features developed during the war. This means faster, better baking . . . more flexibility for new finishes and new products . . . lower finishing costs . . . minimum maintenance . . . maximum dependability.

Available in many standard sizes, gas, oil, electric or steam heated. Designed for future addition of conveyors if desired; also special sizes on request.

*Write for Bulletin No. 51 or call for an Engineer*

**DESPATCH OVEN COMPANY** MINNEAPOLIS 14 CHICAGO 1

## *Allegheny Ludlum Buys Magnet Producing Co.*

*Pittsburgh*

• • • **Allegheny Ludlum** Steel Corp. will expand its line of magnet steels to include all types of "hard" and "soft" magnets, magnetic and non-magnetic alloy steels by acquiring the Arnold Engineering Co., one of the largest manufacturers of permanent magnets, Jan. 2, 1946. This announcement was made by Hiland G. Batcheller, president of Allegheny Ludlum. Arnold Engineering Co. specializes in the Alnico alloys, licensed from General Electric Co., and other "hard" magnetic materials.

Allegheny will exchange 25,000 shares of its common stock, worth approximately $1,000,000 at current stock market prices, for the 500 shares of Arnold's stock, all of which is held by Robert M. Arnold, research engineer and president of his company. The new stock is to be issued around Jan. 2.

In addition, Allegheny agrees to give one share of its stock for each $34 recovered by the Arnold Co. upon claims for a $261,000 refund of excess profits taxes for the years 1942 through 1944.

Allegheny Ludlum has been a leading producer of silicon steels and other "soft" magnetic alloys. The company also produces some of its own "hard" magnetic alloys and others acquired in 1944 under license from the Western Electric Co.

Permanent magnets will be produced in every practicable shape and in sizes ranging from a fraction of an ounce to 100 lb. To assist manufacturers and engineers in the highly specialized field of magnet design, the company will expand its engineering service department.

Peacetime applications of high strength permanent magnets have been greatly accelerated by widespread wartime experience in using them. Among ordnance applications are three of the most spectacular projects of the war—radar, the atomic bomb, and the proximity fuse.

The advantages to be gained by using high strength magnets in preference to magnets of lower remanence and coercive force are improvement in operating performance of equipment, reduction or sometimes avoidance of energizing coils and current, and reduction in size and weight of equipment, which often result in greatly reduced costs. Alnico and other strong magnets are also many times more stable than lower strength magnets under the influence of heat, vibration, stray magnetic fields, and time. As a consequence they are more reliable than a power source for producing a magnetic field.

In aircraft where minimum weight and size are essential, permanent field magnets are used on many remote controlled motors, thus not only reducing size and weight of motors but also reducing or eliminating the electric power required for energizing the field magnets.

Similar advantages are gained in such commonplace things as portable radio loud speakers and hearing aid receivers, for example, where strong magnets can be utilized to reduce the battery power required, as well as the weight and size of these products. These advantages have also proved valuable in such products as magnetos, speedometers and generators for auto-

**TRANSPORT PLANE:** *A Canadian* **10***-passenger cargo and passenger transport plane, called The Noorduny Norseman "V". The plane is being built at Montreal on a three-a-month schedule.*

# RUST STEALS MONEY

## Stop it!

Those millions of dollars stolen annually by rust's scaly fingers . . . why let them be your dollars? Stop the rust thief in your plant!

Sinclair preventives that helped solve the war's tremendous rust problems are available to end *your* rust troubles. Whether it be protection for

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- machinery in transit,
- piping, shafting, etc., exposed to corrosion,

there's a Sinclair *war-tested* preventive that *stops* rust . . . extends equipment durability . . . lengthens the life of metal installations.

Sinclair rust preventives are easily applied, easily removed — and they protect both internal and external surfaces.

Write us for information about application of Sinclair Opaline* RP Oils, and Sinclair Rust-O-Lene* rust preventives to your problems.

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## SINCLAIR INDUSTRIAL OILS

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motive equipment, in all kinds of electrical instruments, and in circuit breakers, limit switches, electric clocks, and many other electrical parts and products.

Although the greatest demand for "hard" permanent magnets will be by manufacturers of electrical and electronic equipment, they have become increasingly useful in non-electrical products. These now include magnetic chucks, holding devices, clamps, damping devices, clutches, magnetic separators, coin operated machines, lubricating oil filters, advertising novelties, toys and many others.

The Arnold Engineering Co. began producing permanent magnets in 1935, when Robert M. Arnold entered the firm as president and general manager. Mr. Arnold, who formerly was chief radio engineer of the Grigsby-Grunow Co. and of British Philco, was one of the earliest to see the possibilities of the new alnico magnet alloys, and turned the whole energies of the company to development in that field. He will continue in active association with the enterprise, under Allegheny Ludlum ownership.

## Joins Mellon Institute

*Pittsburgh*

• • • **The appointment of** Lt. Col. Theodore F. Hatch, noted industrial health engineer, to the staff of Industrial Hygiene Foundation at Mellon Institute, Pittsburgh, was announced. Col. Hatch recently returned from the Pacific Theatre and was discharged from the Army where his duties included the ventilation of tanks.

He was attached to the Armored Medical Research Laboratory, Fort Knox, Ky., as executive officer, and was concerned with physiology and engineering problems involved in adapting men to the machines of war.

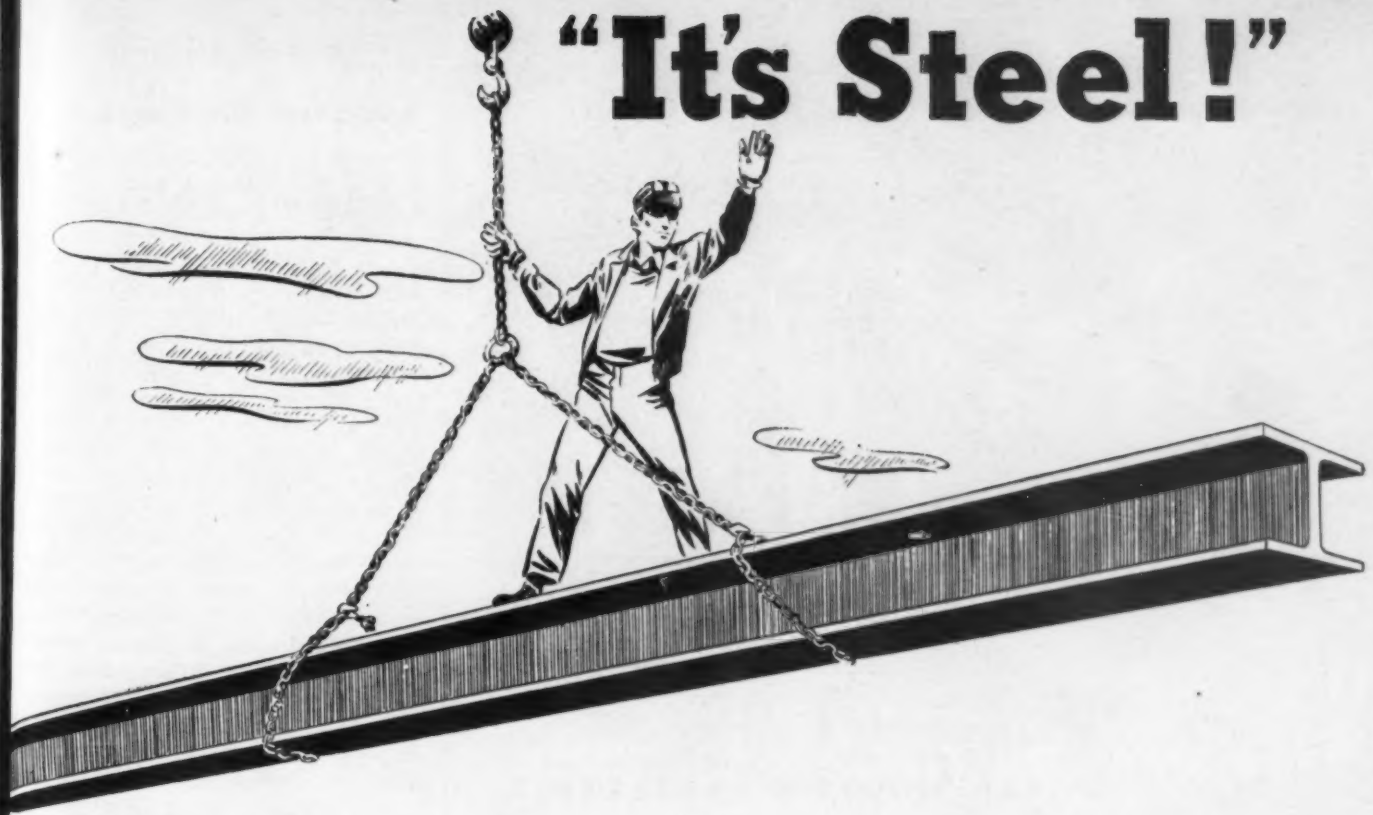
## Cites Cooperation Need

*Chicago*

• • • **Need for cooperation** with the government by the used-machine-tool industry "for quite a long period of time" recently was expressed by R. K. Vinson, executive director of the Machinery Dealers National Assn.

"It is recognized by many leaders of the industry that the association must collect basic statistical data and develop a public relations program which will properly apprize the public of the industry's affairs," he said in a message to the association membership.

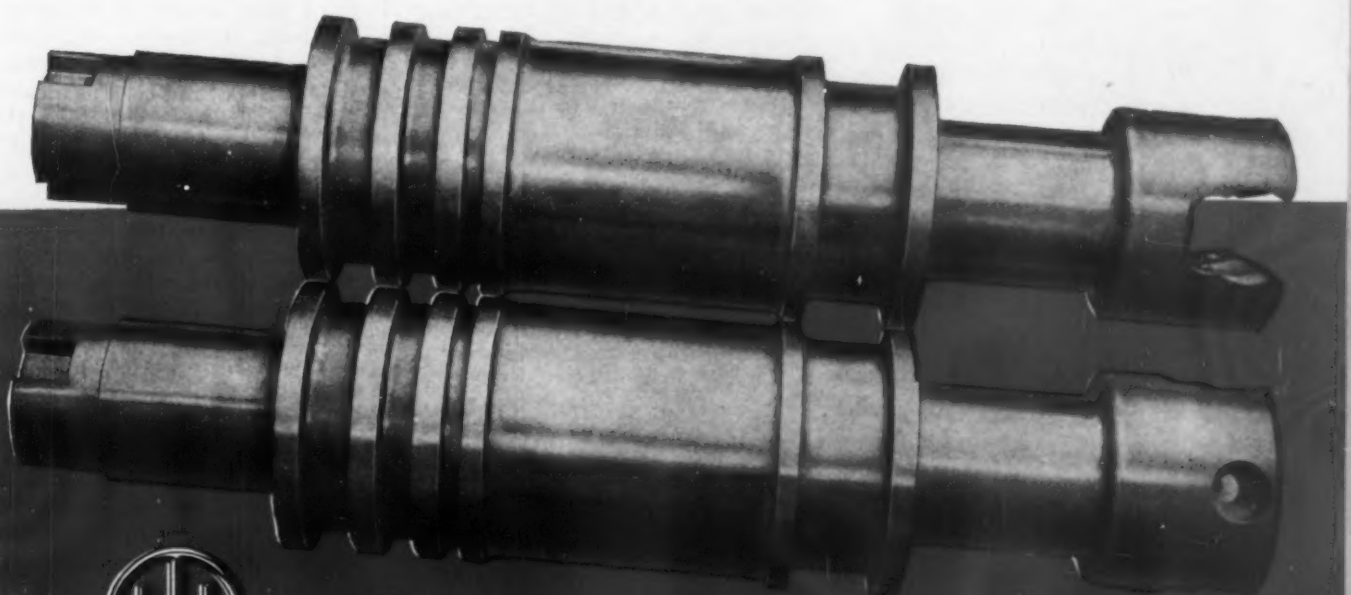
# "It's Steel!"



Steel, in all its thousands of uses, has demonstrated so well its attributes of strength, durability and versatility that the words, "It's Steel!" carry with them an expression of finality and of acceptance wherever they are heard.

Today, for the first time since 1942, steel is slowly becoming available in quantity for civilian enterprise. If the output is to be anywhere near adequate, production levels must be kept high.

With this firmly in mind, The Ohio Steel Foundry Company continues to produce and ship fine steel rolls to America's steel mills in the quantity and quality necessary for sustained capacity production.



PIONEER FOUNDERS MACHINISTS

Select from any of these 9 types of Ohio Steel and Iron Rolls: Carbon Steel Rolls • Ohioloy Rolls • Ohioloy "K" Rolls • HOLL-O-CAST Rolls Chilled Iron Rolls • Duplex Iron Rolls • Nickel Grain Rolls • Hi-nickel Grain Rolls • Pinion Rolls

Free Enterprise Is The Only Way To Constantly Higher American Living Standards

# Ohio Rolls

THE OHIO STEEL FOUNDRY COMPANY

LIMA, OHIO • PLANTS IN LIMA AND SPRINGFIELD, OHIO

## Scrap Institute Elects

*New York*

• • • **The president and** other officers and the executive committee of the Western New York Chapter of the Institute of Scrap Iron & Steel, Inc., all have been reelected for the coming year. The officials are as follows: President, Harry Markowitz of Abe Cooper, Inc., Syracuse; vice-president, Saul S. Frankel of Rochester Iron & Metal Co., Rochester; and secretary-treasurer, Leo Chapin of Chapin & Fagin, Inc., Buffalo.

Members of the executive committee are: Nathan H. Jacobs of Buffalo House Wrecking & Salvage Co., Buffalo; Joseph Maher, Jr., of Pennsylvania Wood & Iron Co., Inc., Buffalo; Max Pressler of Summer & Co., Inc., Buffalo; Jack Rubenstein of A. Cooper Metal Co., Inc., Syracuse; and Saul S. Spiegel of Elmira.

•

*Albany*

• • • **Joseph C. Klein** of Joseph C. Klein, Albany, has been elected president of the Capitol District Chapter of the Institute of Scrap Iron & Steel, Inc., succeeding Milton Symansky of Symansky Brothers, Watervliet, N. Y.

Other officers who were elected include: vice-president, **Louis Sirk** of Trojan Scrap Iron Corp., Troy; secretary, Benjamin Apple of Symansky Brothers, Watervliet; and treasurer, Philip Sher of Hudson Scrap Iron & Metal Co., Albany.

The executive committee for the coming year will consist of: chairman, Milton Symansky of Symansky Brothers, Watervliet; Charles Buff of Buff & Buff, Schenectady; Samuel Garbowitz of Samuel Garbowitz Scrap Iron & Metal, Schenectady; Alec Henry of C. C. Henry Co., Inc., Pittsfield, Mass.; Abe Nathan of Abe E. Nathan & Sons, Utica; Herman L. Symansky, Watervliet; and Emil Wolf of Construction Sales Co., Inc., Albany.

•

*Baltimore*

• • • **Jacob S. Shapiro** of United Iron & Metal Co., Baltimore, has been elected president of the Seaboard Chapter of the Institute of Scrap Iron & Steel, Inc., succeeding Israel D. Shapiro of the United Iron & Metal Co., Baltimore. Other officers are: vice-president, Harry Klaff of H. Klaff & Co., Baltimore; and secretary-treasurer, Samuel Lazinsky of Continental Iron & Metal Co., Baltimore.

Members of the executive committee are: Hyman Block of N. Block & Sons, Norfolk, Va.; J. Chertkof of The Boston Metals Co., Baltimore.

## Asserts Earnings Of Steel Companies Are Running Into the Red

*New York*

• • • **Study of the most** recent earnings figures of some of the leading steel companies shows that they are either running in the red or are dangerously close to it, said Walter S. Tower, president of American Iron & Steel Institute, speaking recently on a program sponsored by the institute over an American Broadcasting Co. network.

Mr. Tower appeared with Dr. Jules Backman, professor of economics, New York University, in a discussion of steel wages.

"During the past few days I asked some of the leading steel companies what they earned in October," said Mr. Tower. "The companies I questioned, and they represent a big share of the industry, earned on the average at the rate of barely 2 pct on their investment in October. In October a good deal more steel was turned out than in the best month of 1937. Yet for every dollar which the companies earned after taxes back in 1937, they are making only 25¢ today."

Mr. Tower asserted that steel companies as a result of increases in their costs of production are in "a serious situation" from the standpoint of their selling prices. He stated that earnings of steel workers are averaging over $50 per week, including overtime, and that the demand of the steel union for a $2-per-day wage increase for each worker would add $225,000,000 per year to the industry's costs.

Dr. Backman pointed out that wages and prices are closely related and that the current steel wage question is one affecting "the whole national economy."

## Barium Reports Earnings

*New York*

• • • **Barium Steel Corp.,** for the nine months ended Sept. 30, reports net earnings, after depreciation and amortization and after writing down mineral claims and development, but before Federal income taxes and provision for renegotiation of contracts, amounted to $449,962. Mineral claims and development writedown amounted to $53,092.

The consolidated net earnings include the third quarter earnings of Erie Bolt & Nut Co., a wholly owned subsidiary acquired June 22, 1945.

# Work Starts on Brazilian Steel Plant Foundry

***Dual purpose facility to cost $1,850,000 and will be one of most unusual foundries in the Western Hemisphere***

CONSTRUCTION of a foundry—one of the most unusual in the Western Hemisphere—for the large Brazilian National Steel project at Volta Redonda, Brazil, has been started.

The foundry, according to Roy I. Jones, head of the Industrial Engineering Division of Giffels & Vallet Inc., L. Rossetti, associated engineers and architects, Detroit, who designed the complete foundry project, will produce ingot molds and stools, iron grain and chilled rolls, steel rolls, miscellaneous iron, steel and nonferrous castings. The foundry which will cost approximately $1,850,000 will pioneer in many ways the reduction of hand labor and the improving of working conditions in the Brazilian foundry industry.

The foundry is a dual purpose facility. Half of the space is devoted to highly mechanized production systems for the regular supply of ingot molds and stools. The remaining half of the foundry is primarily for production of castings to keep the mill equipment in constant operation, and has facilities and equipment capable of producing any casting in the entire steel mill.

The foundry is designed so that ingot molds may be poured with hot blast furnace metal direct from the open-hearth mixers. Its equipment includes a cupola, air furnace, electric furnace, monophase furnace, nonferrous metal furnace, annealing furnaces, pit type ingot mold ovens, a completely mechanized sand conditioning and distribution system, casting and cleaning equipment, roll turning lathes, and ingot mold milling equipment.

The jobbing nature of this foundry's operations requires that it be, in addition to an ingot mold foundry, a steel foundry one week, an iron foundry the next, and perhaps a roll foundry the following week. This gave rise to the requirement that, in addition to the charging of the cupola, the arc furnace and air furnace would need to be charged at various times both with cold charges and with hot charges for duplexing.

The foundry has been designed for ready expansion to provide an additional 150 per cent capacity. Construction of the foundry is expected to be completed in about nine months, about the time when the main portion of the steel mill will be completed.

*Reprinted from STEEL Magazine*

## *M.I.T. Radar Research Leads to Extensive Engineering Series*

*Cambridge, Mass.*

• • • **Publication of the largest** series of books on physics and electrical engineering ever undertaken in the United States has been arranged by the Massachusetts Institute of Technology for the Office of Scientific Research and Development, according to James R. Killian, executive vice-president of the institute. The Radiation Laboratory Technical Series, comprising 28 titles and a general index, reports the results of 5 yr wartime work on radar. The purpose of the series is to make available to science, industry, and the public generally the results of the immense developments in electronics and in microwave theory and technique during the war years. These will be of inestimable value in peacetime research in physics, biology, and other natural sciences, as well as providing the engineering foundation for postwar industrial developments in television, communications, and electronics.

Work reported in the series required the expenditure of about 20,000 technical man-yr in the various radar research and development establishments, Dr. Killian revealed. "For the first time," he said, "the technical literature of a large subject is being created all at once, on a uniform basis. Emphasis in the series will not be on radar itself, but rather on the basic techniques which underlie many phases of electronics in addition to radar."

**Books of the** series are being written chiefly by staff members of the Radiation Laboratory, wartime radar research center maintained at M. I. T. by OSRD contract, but will include the results of work on radar done in British development establishments and in industrial laboratories both here and in England. Several British scientists have come to M. I. T. to cooperate in the preparation of the series.

Summaries of the scope and contents of the series show that it covers several fields of the greatest scientific and engineering importance. Some of these are: Precise timing techniques; new methods of cathode ray tube display; generation, transmission, and radiation of high-power microwaves; and broadband amplifier techniques. Present titles planned for the series follow:

The generation of high power mi-

**For 2 years CLEVELAND TRACTOR CO.** has used Ajax-Hultgren furnaces for carburizing transmission and differential gears, stem pinions, spline shafts, and other heavy-duty tractor parts.


# CLEVELAND TRACTOR CO.

## REDUCED SCRAP BELOW 1/10 OF 1%

## *...Savings due to lowered distortion alone paid for furnaces.*

*Says* W. A. SILLIMAN, *Chief Metallurgist*

Here are the observations of W. A. Silliman*

"Changeover from gas to salt baths has solved our major problem of distortion. It has cut rejects from 10% to zero, and on high speed parts from 50% to 1/10th of 1%. Reduction in scrap has paid for the furnaces.

"Where it was necessary to plug-quench gears in order to maintain size, it is now possible to run all of these gears by direct quench from the bath.

"The floor space now used is 1/4th that required by former methods, and the cycle has been cut from 8-hr. to 4-hr. total time. This has provided us with greatly increased output.

"We believe this due to inherent advantages of the method, the uniformity made possible by the internal heating and circulatory effect of the closely-spaced Ajax-Hultgren electrodes, as well as a more uniform quench than was possible by previous methods."

These observations were made during a recent 11-month period, during which 339,229 lb. of parts were carburized.

*From a paper "Liquid Carburizing of Transmission Gears," available on request. Write for this and Catalog 107-B.

**AJAX ELECTRIC CO., INC.**
**Frankford Ave. at Delaware Ave., Philadelphia 23, Pa.**


THE **AJAX** HULTGREN **ELECTRIC SALT BATH FURNACE**

Associate Companies: Ajax Metal Co. • Ajax Electric Furnace Corp. • Ajax Engineering Corp. • Ajax Electrothermic Corp.

crowaves is dealt with in a book on "Microwave Magnetrons" which presents the theory of operation of these oscillators as well as practical design considerations and operating techniques. "Low Power Microwave Tubes" deals principally with the properties of reflex klystrons and lighthouse tubes when used as oscillators, amplifiers, rectifiers and mixers. Production of accurately timed pulses having various waveforms at high and very high peak powers is treated in "Pulse Generators." A theoretical and practical treatment of pulse transformers is also included in this book.

**Transmission line** and waveguide techniques are discussed exhaustively. "The Theory of Guided Waves" develops a basic theory of electromagnetic waves in waveguide. This theory draws from conventional field theory, circuit theory, and transmission line theory, but is directed to the solution of problems of importance in the microwave region. A "Wave-guide Handbook" collects the analytical results given by the theory and presents all available numerical and experimental results in graphic form, chosen to be most convenient for practical circuit design. "The Principles of Microwave Circuits" develops a generalization of low-frequency network theory and of the impedance concept. The properties of waveguide circuit elements and devices are developed and discussed in terms of this generalization. "Microwave Transmission Circuits" treats from a practical point of view the same general matters. Design principles for connectors, rotary joints, and other waveguide and transmission line devices will be discussed, and examples of succesful designs given. "The Techniques of Microwave Measurements" describes in detail the methods of measuring power and attenuation at high and low level, standing wave measurements, means for accurate determination of wavelength and frequency, RF spectrum and pulse shape, and other means of measurement peculiar to the microwave field.

**"Microwave Antenna Theory and Design"** provides a comprehensive survey of theory and design techniques for microwave antennas, a full discussion of antenna measurement methods, and an indication of special methods used in antenna production. "Propagation of Short Radio Waves in the Troposphere" collects and summarizes the very extensive wartime investigations of the propagation characteristics of radiation at frequencies too high to be affected

by the ionosphere. The theory of atmospheric refraction, the meteorology of the refraction problem, and the experimental approach to the refraction problem will be followed by a treatment of matters which include target properties, ground and sea clutter, and molecular absorption.

"Crystal Rectifiers" discusses the theory, properties, manufacture, and use of the silicon and germanium point contact rectifiers which have been developed for use as microwave converters and other circuit applications. "Microwave Receiving Circuits" deals with the problem of frequency conversion and duplexing. Means of automatic frequency control for a local oscillator are discussed, and designs of mixers and duplexing assemblies are described.

A series of works on the design and application of vacuum-tube circuits is opened with the "Components Handbook" which describes the properties of available wire, resistors, capacitors, inductors, instrument motors, potentiometers, and other circuit elements. Emphasis is placed on the specifications which components meet and on features of performance which are not usually given in other publications. The book includes the results of independent measurements of important properties of various types of commercial components. "Cathode Ray Tubes" describes methods for using such tubes, with emphasis on good focus, freedom from distortion, and reliable operation. It includes discussions of focusing and deflection magnets and coils, the properties of fluorescent screens, and methods of constructing auxiliary apparatus such as projectors, magnetic shields, light filters, and the like.

**Two books follow** which analyze the fundamental properties of basic circuits useful in the various branches of electronics. "Vacuum Tube Amplifiers" deals with circuits which can be treated theoretically by linear circuit analysis. It seeks to analyze completely many types of amplifiers, especially those of high grain, wide band pass, or large dynamic range. Constructional details of special amplifiers, and rigorous critical discussions of amplifier sensitivity will be given. "Waveforms" discusses basic circuits which include a non-linear element. These and other circuits for the generation and shaping of the form of current and voltage waves are analyzed with the help of the cathode-ray oscillograph. The waveforms described make possible radar and television displays, and permit

the precise measurement of time and position. A treatment of their generation is followed by discussions of their manipulations, such as modulation, analysis, and frequency division.

**Then follow those** books whose object it is to present design techniques for synthesizing from the basic circuits and components just described the complex instruments required to fill various functional demands. "Electronic Instruments" deals with devices for the purpose of precision time measurement, data transmission, and mathematical computation. It emphasizes instrument function, gives details of engineered circuit designs, and recommends preferred equipment types where possible. "Cathode Ray Tube Display Circuits" shows how cathode ray tubes may be combined with electronic circuits to provide a wide variety of measuring and precision data display devices. Application of such devices include the precision measurement of time intervals shorter than 0.0001 micro-second, and the plotting of several functions of several variables simultaneously in any of several coordinate systems, as well as special devices suitable for radar and television use.

**The use of electrical** and other time-variable indications in automatic control devices is discussed in "Automatic Control Systems." Basic principles for the design of electrical and mechanical feedbacks control systems are developed in detail, and application is then made to a series of automatic control problems, including those which have arisen in automatic radar range and angle tracking.

"Microwave Receivers" describes many different types of complete receiving systems, suitable for radar, television, relay telephony and repeat-back devices. Examples are chosen to illustrate actual design techniques. "Signal Thresholds in Interference" offers an analysis, both theoretical and experimental, of the factors affecting the perception of desired signals in the presence of various types of interference, principally receiver noise.

An outline of the general principles of design of radar systems is presented in a volume entitled, "Radar Systems Engineering." It is intended as a basic treatise and reference book for anyone interested in making any application of radar.

The applications of radar to problems of air and sea navigation, including airport and harbor traffic control, are discussed in a volume entitled, "Radar Aids to Navigation."

## Reports on October Foundry Operations In Philadelphia District

*Philadelphia*

• • • **A sharp upturn** in the production of iron and steel castings occurred in October in foundries in the Third Federal Reserve District according to reports received by the Industrial Research Dept. of the University of Pennsylvania. Gray iron production was back almost to the level of last May; malleable iron output was higher than any month since last March; and steel output almost wiped out the drop from August to September. Shipments kept pace with production, but even so unfilled orders increased except for iron castings in one area. Stocks of pig iron and coke were generally higher and scrap iron stocks lower.

Total gray iron output rose 26.8 pct as a result of increases in both jobbing work and the output of castings for further manufacture throughout the district except in the Reading area where there was a 16.7 pct decline in the production of castings for use within the plant. The rise was shared by 21 of the reporting gray iron foundries.

Shipments of finished castings equaled or approximated total production except in the balance of the district where malleable iron shipments are included with those of gray iron. These shipments were 28.3 pct higher than in September, although gray iron production was only 13.1 pct higher.

Despite the increases in production and shipments, the orders on hand but unfilled rose markedly except in the balance of the district where they declined 4.3 pct. Increases of 18.8 and 53.1 pct in the other two areas left the district as a whole with an increase of 11.2 pct. Pig iron supplies were larger except in the balance of the district; scrap iron stocks were smaller and coke supplies were larger everywhere except in the Reading area.

Malleable iron production rose 50.1 pct above its September output, but even so it was 16.5 pct below that of October 1944.

For the first time since June 1945, gray iron output was higher than in the corresponding month of 1944. The increase was not great and did not affect the production of castings for further manufacture within the plants.

The 19.7 pct increase in total production of steel castings during Oc-

tober nearly offset the sharp decline of September so that production almost equaled that of August. All but one of the reporting foundries contributed to the rise, which followed the pattern set in thirteen other of the 20 yr for which we have continuous records. Jobbing work was one-fifth higher than in September and the output of castings for further manufacture was nearly one-tenth higher. Shipments of finished castings rose 18.1 pct. Orders on hand at the end of the month were 32.3 pct above the reserve at the end of September. At the current rate of production the orders will keep the foundries busy into the middle of January.

Pig iron and coke stocks were 31.2 and 18.6 pct respectively larger than at the end of September, but scrap iron stocks were 11.0 pct smaller.

Even with the sharp current increase in production, the level of 1945 is far below that of 1944. Only the relatively unimportant output of castings for further manufacture was higher than in last October. All other indicators of activity were between 30 and 42 pct lower.

## Rust Furnace Takes Large Furnace Contract

*Pittsburgh*

• • • **Rust Furnace Co.**, Pittsburgh, has started construction of three large industrial furnaces for Chicago Bridge & Iron Co. at Chicago, Greenville, Pa., and Birmingham.

The furnaces at Chicago and Greenville will be used for the stress relieving of welded pressure vessels. The other, at Birmingham, will serve primarily for the heating of heavy plates prior to forming and for alloy heat treating at high temperatures.

Largest of the three furnaces, which is 85 ft x 15 ft 2 in. x 16 ft high (from car floor to spring of arch), and has a car width of 11 ft is being erected at the company's home plant in Chicago.

The stress reliever at Greenville has the same cross section as the Chicago furnace, but is 20 ft shorter in length. The Birmingham furnace is 42½ ft x 17 ft x 8 ft 9 in. high.

The structures at Chicago and Greenville have sprung roofs and the Birmingham furnace has a suspended roof.

Rust Furnace Co. designed and erected a stress relieving furnace at the Chicago Bridge & Iron Co.'s plant at Birmingham in 1937. It is similar to the new installations at Chicago and Greenville.

## *Modern Russian Steel Production Methods Cited by Delegate*

*New York*

• • • **The Iron and Coal Trades Review has recently published a report on the Magnitogorsk Iron and Steel Works, made by Mr. Emlyn Roberts, member of a delegation sent to Russia last summer by the Iron and Steel Trades Confederation.**

**According to the report, the Magnitogorsk works project, situated in the Ural Mountains, is of immense proportions, the output of steel being about 66,000 tons per week. Iron ore is plentiful and easily accessible, but coal has to be brought from the Donetz Basin, the wagons returning with pig iron for the steel works in the Moscow area. The ore is crushed in three Krupp ore-preparation plants, each of which is capable of handling 15,000 tons of ore per 24-hr period. Four American-made blast furnaces, each capable of producing 1500 tons of pig per 24 hr, and two Russian blast furnaces, each with an output of 1700 tons per 24 hr, are in operation, with two more large blast furnaces under construction. There will finally be ten coke-oven batteries with an aggregate output of 16,000 tons per 24 hr.**

**The openhearth plant includes 12 190-ton and nine 350-ton static basic openhearth furnaces, with venturi ports, and provided with extensive water-cooling arrangements, the former being tapped at 16 hr intervals, and the latter every 12 hr. The furnaces are coke-oven-gas fired, with a tar addition. Modern control equipment is employed, the openhearth reversals, for instance, being automatic, and depending upon checker temperatures. Ingots up to nine tons are cast. Pit-side equipment is adequate, and at the larger of the two steelworks there are six 260-ton cranes and a number of lighter units. Each 350-ton furnace has a crew of five men, and four in the case of the 190-ton furnaces. The original hearths are of magnesite, plus a small flux addition, being fettled with raw dolomite of excellent analysis. When the plans for the openhearth plant are complete, it will be capable of handling 16,000 tons of hot metal per 24 hr. The pig iron from the blast furnaces contains: C—3.5 to 4.0; Si—0.5 to 1.0; P—0.06; S—0.03; Mn—1.5 to 2.0 pct.**

**The Russian trade unions play a**

very important part in the worker's life. Each 300 members elect one delegate to the Annual Congress. From this a Central Council of 35 members is elected, which meets quarterly, and in turn elects a Presidium, which meets every fortnight. The chairman and secretary of the Presidium are elected by ballot for 2 yr. Trade union meetings are held at each works by a works committee elected from delegates of the various sections. The expenses of the union must not exceed 40 pct of the contributions. Rates of pay are fixed by agreement between the local committees and the works management. The Commissariat of the Industry must confirm such agreements. Differences can be referred to a Central Committee of all trade unions, whose decision is final.

## Timken Net Income Down

*Canton, Ohio*

• • • **The Timken Roller Bearing Co.** reports income for the first nine months of 1945, period ended Sept. 30, of $4,168,578, equal to $1.72 a share on the 2,421,380 shares of outstanding capital stock. The report makes provision for depreciation and amortization, estimated taxes and all other charges, but is subject to audit, year-end adjustments and possible adjustments resulting from renegotiation of contracts.

Provision has been made of $2,893,500 for income tax and $2,002,700 for excess profits tax, computed under the Revenue Act of 1943 and the Tax Adjustment Act of 1945. An additional amount of $250,500 has been provided to cover possible contingencies.

Income for this period indicates a decrease of $443,348 from the $4,611,926 income of the same period in 1944.

## Orders Rototiller Parts

*Willow Run, Mich.*

• • • **The Farm Equipment** Div. of **Graham-Paige Motors Corp.** has placed a $750,000 order for parts of the Rototiller, multi-purpose farm machinery, with Rumsey Mfg. Co., Seneca Falls, N. Y.

The contract is for tiller assemblies and tine-holder assemblies. Schedules, according to J. W. Frazer, chairman of the automotive firm, call for production of approximately 50,000 Rototillers during the first year of full production at Willow Run.

## Tin, Manganese And Copper Shrinkages In Strategic Stocks

*Washington*

• • • **Sharp shrinkages** took place in a number of strategic metals and minerals held by RFC Metals Reserve on Oct. 31, as compared with holdings of Sept. 30, the latter published in THE IRON AGE of Nov. 22, page 126, Figures announced by CPA show that on Oct. 31 stocks of pig tin were 21,163 tons compared with 53,551 tons on Sept. 30. Manganese stocks declined to 939,543 tons from 1,194,667 tons and copper stocks dropped to 498,406 tons from 543,843 tons. There were increases, however, such as in nickel stocks which rose to 36,620,421 lb from 34,644,021 lb.

Some of the cobalt nickel, copper and aluminum listed as being held by RFC is stored in Canada; otherwise the quantities listed are held in the United States.

Stocks held on Oct. 31, were given by CPA as follows:

| | | |
|---|---|---|
| Antimony—metal | 2,089 | net ton |
| oxide | 66 | |
| ore | 8,157 | |
| Beryl Ore | 4,768 | |
| Cadmium | 1,225,971 | lb |
| Chromite—metallurgical Russian | | |
| high grade | 236,297 | gross ton, dry |
| other | 159,875 | |
| low grade domestic | 111,861 | |
| Chromite—refractory | 236,855 | gross ton, dry |
| Cobalt | 3,295,421 | lb |
| Copper—refined | 498,406 | net ton |
| Fluorspar—metallurgical | 177,557 | net ton |
| Graphite—Madagascar | | |
| flake | 558 | metric ton |
| fines | 1,658 | |
| Graphite—Ceylon | | |
| 95 pct | 207 | gross ton |
| 90–95 pct | 54 | |
| Lead—primary refined | 86,242 | net ton |
| Magnesium—secondary | 2,215,562 | lb |
| Manganese— | | |
| metallurgical | 939,543 | gross ton, dry |
| battery | 0 | |
| chemical | 0 | |
| Mercury | 63,638 | flasks |
| Molybdenum | 4,746,202 | lb |
| Nickel | 36,620,421 | lb |
| Platinum | 55,166 | troy oz |
| Tantalite ($Ta_2O_5$) | 420,861 | lb |
| Tin—pig | 21,163 | gross ton |
| Tungsten | 22,012,743 | lb |
| Vanadium | 1,805,568 | lb |
| Slab Zinc | | |
| grade A | 167,437 | net ton |
| grade B | 79,884 | |
| Aluminum—ingot | | |
| primary | 385,140,355 | lb |
| secondary | 6,223,108 | lb |
| Bauxite | 2,712,688 | gross ton, dry |
| Bismuth | 782,514 | lb |
| Celestite | 9,210 | net ton |
| Columbium | 33,991 | lb |
| Corundum—grain basis | 1,443 | gross ton |
| Cryolite— | | |
| refined equivalent | 25,512 | net ton |
| Iridium | 3,147 | troy oz |
| Osmium | 185 | troy oz |
| Rhodium | 161 | troy oz |
| Zircon | 2,581 | net ton |

# Mesabi Taconite Sinter Costs Set at $6

*Minneapolis*

• • • Figures on the cost of beneficiating Mesabi low grade taconite ore presented in the 1945 Mining Symposium at the University of Minnesota and published in Information Circular No. 5 of the Minnesota Mines Experiment Station indicate the cost of the production of taconite concentrate.

In considering the cost of producing sintered concentrate from Mesabi taconite, O. H. Johnson, president of the Mine and Smelter Supply Co. of Denver, stated it is necessary to discard all comparisons with normal Mesabi practice as it exists today and think more of western low grade copper mining and concentrating practice. At several of these western copper properties, ore containing 1 pct copper is mined, crushed, ground fine and concentrated by flotation at the rate of 10 or 15 million tons per year. These are big, expensive plants and by studying operating conditions and costs at these plants, good approximations can be secured of the cost of taconic beneficiation. The Bingham plant of the Utah Copper Co. at Salt Lake City, for example, is treating 50,000 tons of crude ore per day. This is over 15 million tons per year. If this ore were magnetic taconite, over 5 million tons of concentrate would be produced in this plant. Recent costs at the Utah plant are not available but a number of years ago the total cost, including all fixed charges, were as follows:

| | |
|---|---|
| Mining | 41 |
| Ore delivery (17 miles) | 09 |
| Milling | 37 |
| Total | 87¢ |

The taconite will be harder to drill and mine than the copper ore but ore delivery cost will be much lower than at Utah. Utah ore is ground to about 70 pct—200 mesh while the taconite must be ground to 94 pct—200 mesh. However, a considerable portion of the taconite is discarded at sizes between ¼-in. and 100 mesh, thus reducing the work required of the ball mills. The resistance to grinding of the Utah ore is about the same as the taconite. In the concentration of the copper ore by flotation, there is a reagent cost of about 4c per ton that will not be an item in the concentrates of magnetic taconite. The taconite concentrate must be sintered before shipment, an operation not required in the treatment of copper ore.

Taking all of these factors into consideration, the following tentative total costs are presented for the production of the taconite concentrate in an operation producing several million tons of sinter per year.

| Operation | Costs: Per ton of crude | Costs: Per ton of sinter |
|---|---|---|
| Mining and transportation—3 tons | $.50 | $1.50 |
| Milling—3 tons | .40 | 1.20 |
| Sintering—1 ton | | 1.00 |
| Total | | $3.70 |
| Royalty (estimated) | | .15 |
| Taxes | | .06 |
| Total f.o.b. mine | | $3.91 |
| Transportation to lower Lake ports | | 1.91 |
| Total delivered cost | | $5.82 |
| Present Lake Erie price. Mesabi bessemer grade, 65 pct Fe, 0.03 pct P | | $5.98 |

**The Davis process,** or the process for agglomerating fine ores developed at the Mines Experiment Station, has not been used commercially but a large-scale experimental test was run in April 1943 it was said by M. F. Morgan of Arthur G. McKee and Co., Cleveland. The operating and cost data that were recorded from the results of this experimental run show great possibilities for making a preferred blast furnace material from fine ores. A limiting factor in this agglomerating process, however, is that all the ore treated should be 100 mesh; actually 80 pct of that used in the test was 325 mesh.

The conventional blast furnace sintering plant, using flue dust, lake ores, and coke breeze, cannot be compared in any respect with a sintering plant that is compelled to operate on nothing but fine concentrates and coke breeze or culm. A description of a typical blast furnace sintering plant's operations will show why this comparison cannot be made.

The raw materials used in this plant were fine Mesabi ores, screened —½ in., flue dust, both dry and sludge, and coke breeze screened—3/16 in. The coke breeze is used for carbon control in the sintering mixture and the percentage varies as the carbon content of the flue dust varies. Considerable difficulty resulted from irregular feeding of the sludge dust, but otherwise the sintering

plant is of the conventional design which has not been appreciably changed in the last twenty years.

| | |
|---|---|
| Size of sintering machine | 72 in. x 70 ft 3 in. |
| Gate bar area | 422 sq ft |
| Gross ton produced | 35,640 |
| Tons per hour | 49.5 |
| Number of turns operated | 90 |
| Tons per 8-hour turn | 396 |
| Tons per sq ft of grate bar area | 2.8 |
| Practice from total materials charged | 78.7 pct |
| Fe content of the sinter | 62.2 pct |
| Cost per unit of Fe | $0.073 |

**Raw Materials Used**

| | Tons | Price |
|---|---|---|
| Flue dust | 11,110 | $2.51 |
| No. 1 ore | 16,336 | 3.54 |
| No. 2 ore | 12,736 | 3.37 |
| No. 3 ore | 3,430 | 3.59 |
| Coke breeze N. T. | 1,900 | 2.19 |
| Total materials. | 45,308 average | $3.20 per G.T. |

**Raw Material Mixture**

| | | |
|---|---|---|
| Ore—½ in. | 71.7 pct | |
| Flue dust | 24.5 pct | |
| Coke breeze | 3.8 pct | |
| Cost of materials | | $4.08 |
| Cost above material | | .45 |
| Total cost of sinter per ton | | $4.53 |

This plant has operated with a cost above materials charge of less than 50¢ for a number of years.

An experienced operating crew, given a mixture of 72 pct screened Mesabi ore ½ in. with flue dust and coke breeze for fuel, should have no difficulty producing good sinter. This mixture of Mesabi ore, flue dust, and coke breeze is an ideal sintering material and therefore does not present many operating difficulties.

**The sintering process** was developed by the operators who sintered magnetic concentrates, and to the time, thought, and study spent by them in trying to improve sintering practice should be given most of the credit for advancing the sintering process to the position in ore beneficiation that it holds today.

There are at present ten different plants producing sinter from the magnetic concentrates of New York, New Jersey, and Pennsylvania, with an anual capacity of approximately seven million tons, or 29 pct of the total sintering capacity of the United States.

The magnetic concentrates produced at these plants differ both chemically and physically. The various degrees of fineness to which the ores must be crushed for concentration make the individual sintering plant practices differ one from the other in many respects, but the high

efficiency obtained in sintering plant practice at these different plants has resulted in the production of quality sinter from all of them.

The sintering operations at these plants and description of some of the sintering problems which had to be solved will apply in general to the sintering of taconites; but since most of these problems apply to the sintering of concentrates with only 50 pct —100 mesh material, they will be magnified when applied to the sintering of concentrates that are all —100 mesh.

In 1929 a modern sintering plant was built to sinter a fine concentrate of the following screen analysis:

| | |
|---|---|
| +10 mesh | 7.01 pct |
| 20 mesh | 4.70 pct |
| 30 mesh | 5.18 pct |
| 40 mesh | 2.96 pct |
| 60 mesh | 14.75 pct |
| 80 mesh | 4.35 pct |
| 100 mesh | 5.44 pct |
| −100 mesh | 55.61 pct |

This plant was the most modern one ever built up to that time and is today one of the most outstanding sintering plants in the country. No expense was spared on this plant, but many changes in design were necessary before it operated properly because the difficulties that are encountered sintering fine concentrates were underrated when it was originally designed.

The plant has two Dwight Lloyd continuous type sintering machines 72-in. wide and 83-ft long. Each machine had 500 sq ft of grate bar area and was rated at 1000 gross tons or 2 gross tons per sq ft of grate bar area per 24-hr day. The rated capacity was never attained until other materials were added to the sintering mixture that increased the porosity of the sintering machine bed.

A representative cost sheet on this

**Estimated Cost of Sinter Produced at the Mines**

| | Taconite | Mesabi Open Pit |
|---|---|---|
| Annual output | 1,000,000 | 1,000,000 |
| Investment in mine | $1,000,000 | $ 900,000 |
| Mine operating cost | 2.00 | 1.00 |
| Preparation plant: | | |
| Operating costs | 1.46 | .10 |
| Sintering plant: | | |
| Conversion loss | none | .25 |
| Operating cost | 1.07 | 1.07 |
| Cost of sinter | $ 4.53 (64% Fe) | $ 2.42 (61.5% Fe) |
| Transportation to Lake Erie ports | 1.78 | 1.78 |
| Cost of sinter, Lake Erie ports | $ 6.31 | $ 4.20 |
| Cost per unit | 0.098 | 0.068 |

**Sinter at Upper Lake Port or at Cleveland**

| | At Duluth | | At Cleveland | |
|---|---|---|---|---|
| | Screened Ore | Sintered Fine Ore | Screened Ore | Sintered Fine Ore |
| Mining costs | $2.00 | $2.00 | $2.00 | $2.00 |
| Upper rail | .81 | .81 | .81 | .81 |
| Unloading dock to boat | ..... | ..... | .11 | .11 |
| Lake freight | ..... | ..... | .77 | .77 |
| Stockpile | ..... | ..... | .09 | .09 |
| Unloading at sinter plant | .10 | .10 | ..... | .06 |
| Screening | .05 | .05 | .05 | .05 |
| Cost of ore for sintering | $2.96 | $2.96 | $3.83 | $3.89 |
| Cost of ore per ton sinter | ..... | 3.65 | ..... | 4.80 |
| Coke breeze | ..... | .35 | ..... | .17 |
| Fuel oil | ..... | .05 | ..... | ..... |
| Coke oven gas | ..... | ..... | ..... | .02 |
| All other | ..... | .35 | ..... | .35 |
| | $2.96 | $4.40 | $3.83 | $5.34 |
| Switching to ore docks | .05 | .05 | ..... | ..... |
| Unloading at docks | .11 | .11 | ..... | ..... |
| Lake freight | .77 | .77 | ..... | ..... |
| Unloading at lower dock | .09 | .09 | ..... | ..... |
| | $3.97 | $5.42 | $3.83 | $5.34 |
| Fe Analysis, pct | 52.00 | 62.00 | 52.00 | 62.00 |
| Cost per Fe unit, Lake Erie | $0.0763 | $0.0874 | $0.074 | $0.086 |

material in normal times is as follows:

| | |
|---|---|
| Total tons produced | 41,470 G.T. |
| Days operated | 30 |
| Tons per day | 1,382 |
| Tons per sq ft grate bar area | 1.38 |
| Total material cost net | $2.91 |
| Cost of above materials | .85 |
| Total cost | $3.76 |

**Another plant** on magnetic concentrates, concentrated by the dry method, operated for years very satisfactorily and produced sinter that was considered the best quality for blast furnace use in the country. The screen analysis of the dry concentrates was:

| | |
|---|---|
| +10 mesh | 1.2 pct |
| 20 mesh | 27.3 pct |
| 35 mesh | .315 pct |
| 65 mesh | .193 pct |
| 100 mesh | 6.6 pct |
| 200 mesh | 7.4 pct |
| −200 mesh | 6.7 pct |

It was necessary to discontinue the dry method of concentration so the wet concentration method was adopted.

The wet concentration method was designed to produce a concentrate all —35 mesh and this product was to be sintered in the plant that had been producing quality sinter on dry concentrates. No provisions or changes were made in the sintering equipment or flow sheets, therefore the sintering results obtained on dry concentrates —10 mesh and only 14 pct —100 mesh can be compared with the results on wet concentrates all —35 mesh and 62 pct —100 mesh.

The sintering plant operation for the month preceding the starting of the wet concentration plant and the second complete month after the wet concentration method was adopted have been taken as a comparison.

| | Dry Concentrates | Wet Concentrates |
|---|---|---|
| Production | 28,195 G.T. | 19,232 G.T. |
| Concentrates | 27,888 G.T. | 91,929 G.T. |
| Coal culm | 1,713 N.T. | 1,603 N.T. |
| Days operated | 24 | 27 |
| Crew hours operated | 196 | 632 |
| Tons per crew hour | 143.9 | 30.4 |
| Pan turns operated | 121.5 | 201 |
| Tons per turn | 232.1 | 95.3 |
| Cost of above materials | $0.40 | $1.02 |

This example of sintering plant operation is given to illustrate that the design of a sintering plant is governed by the raw materials that are to be sintered and the sinter tonnage required. A sintering plant may be a complete success using certain raw materials but a complete failure

when compelled to use other raw materials.

There are many other examples of sintering plant practice that could be mentioned but it appears that all operations have many difficulties that can be attributed to plant design and equipment which is not efficient. The principal reason for inefficient sintering plant operation is due to the lack of a thorough understanding of the fundamental principles of sinter and how these fundamental principles will function on a specified sintering mixture. Each sintering operation has three major factors that determine what practice can be followed: raw materials, design and operation.

We know that fine taconite concentrates were sintered in 1924, and therefore can be sintered again. The twenty years that have elapsed have brought about many improvements in sintering plant practice and although there are no sintering plants operating at the present time on concentrates which are all —100 mesh, there is no reason why plants cannot be designed for this material. There has been no sintering material available that even approaches the fine taconite concentrates as to fineness and analysis but there have been definite indications as to what the sintering problems will be. By the proper plant design for taconite concentrates, sinter will be produced. However, the economics of the operations and quality of sinter cannot be accurately predicted at this time.

The following table on the estimated cost of taconite sinters, produced at the mines, and based on the annual output of one million gross tons, campared to the cost of Mesab open pit sinter, clearly shows why sintering of taconites has not been attractive commercially.

In connection with the foregoing table, it should be noted that relative costs per unit of iron are not necessarily the same as relative values. The cost of smelting each product in the blast furnaces must also be taken into consideration.

There has been considerable controversy about the cost of sintering at Lake Superior versus the cost of sintering at Lake Erie. The following comparison was made to estimate what advantages or disadvantages there would be at these locations, screening and sintering Mesab ores on new sintering plants.